RL-702 (02/04)

United States Government **Department of Energy**

memorandum

Pacific Northwest Site Office

DATE: JUN 29 2007

REPLY TO ATTN OF: OD:JME/07-OD-0111

SUBJECT: FISCAL YEAR (FY) 2007 PACIFIC NORTHWEST NATIONAL LABORATORY (PNNL) TEN YEAR SITE PLAN (TYSP)

TO: George J. Malosh
Chief Operating Officer
Office of Science, SC-3, HQ

Attached is the approved PNNL FY 2007 TYSP, submittal in accordance with DOE O 430.1B, Real Property Asset Management. The TYSP was reviewed by the Pacific Northwest Site Office and is consistent with the May 15, 2007, Office of Science Guidance for the FY 2007 Ten Year Site Plans. The plan is also consistent with PNNL's Laboratory Strategy and Business Plan and properly identifies and reflects DOE missions and capabilities as they relate to the Laboratory's current and future infrastructure requirements.

On June 22, 2007, the Physical Sciences Facility (PSF) Project Critical Decision-2 was approved by the Energy Systems Acquisition Advisory Board. This project will enable PNNL to retain mission-essential capabilities impacted by 300 Area cleanup. The project was also declared a non-major project which allows subsequent Critical Decisions to be made by the Assistant Secretary's office.

If you have any questions please contact me, or you may contact Joe Escamillo, Operations Division, at (509) 372-4014.

RF Christensen for

Julie K. Erickson
Acting Manager

Attachment

cc w/attach:
J. E. Metzler, SC-31.2

Pacific Northwest National Laboratory
Operated by Battelle for the
U.S. Department of Energy

June 29, 2007

Ms. Julie K. Erickson
Acting Manager
Pacific Northwest Site Office
U.S. Department of Energy
P.O. Box 350, K9-42

Dear Ms. Erickson:

PACIFIC NORTHWEST NATIONAL LABORATORY TEN YEAR SITE PLAN

Enclosed for your attention is the Pacific Northwest National Laboratory (PNNL) Ten Year Site Plan submitted in accordance with DOE Order 430.1B, Real Property Asset Management. This Ten Year Site Plan is provided as of this point in time, prepared according to the guidance provided by DOE-SC, and is intended to be consistent with the current PNNL Laboratory Strategy and DOE-SC Laboratory Plan.

If there are any questions, please contact Rich Davies (375-6474) or Theresa Bergsman (372-6079).

Very truly yours,

Larry E. Maples, Director
Facilities and Operations

LEM:slj

Enclosure

cc: Roger F. Christensen, PNSO
Terry L. Davis, PNSO
Joe M. Escamillo, PNSO
Deborah E. Trader, PNSO

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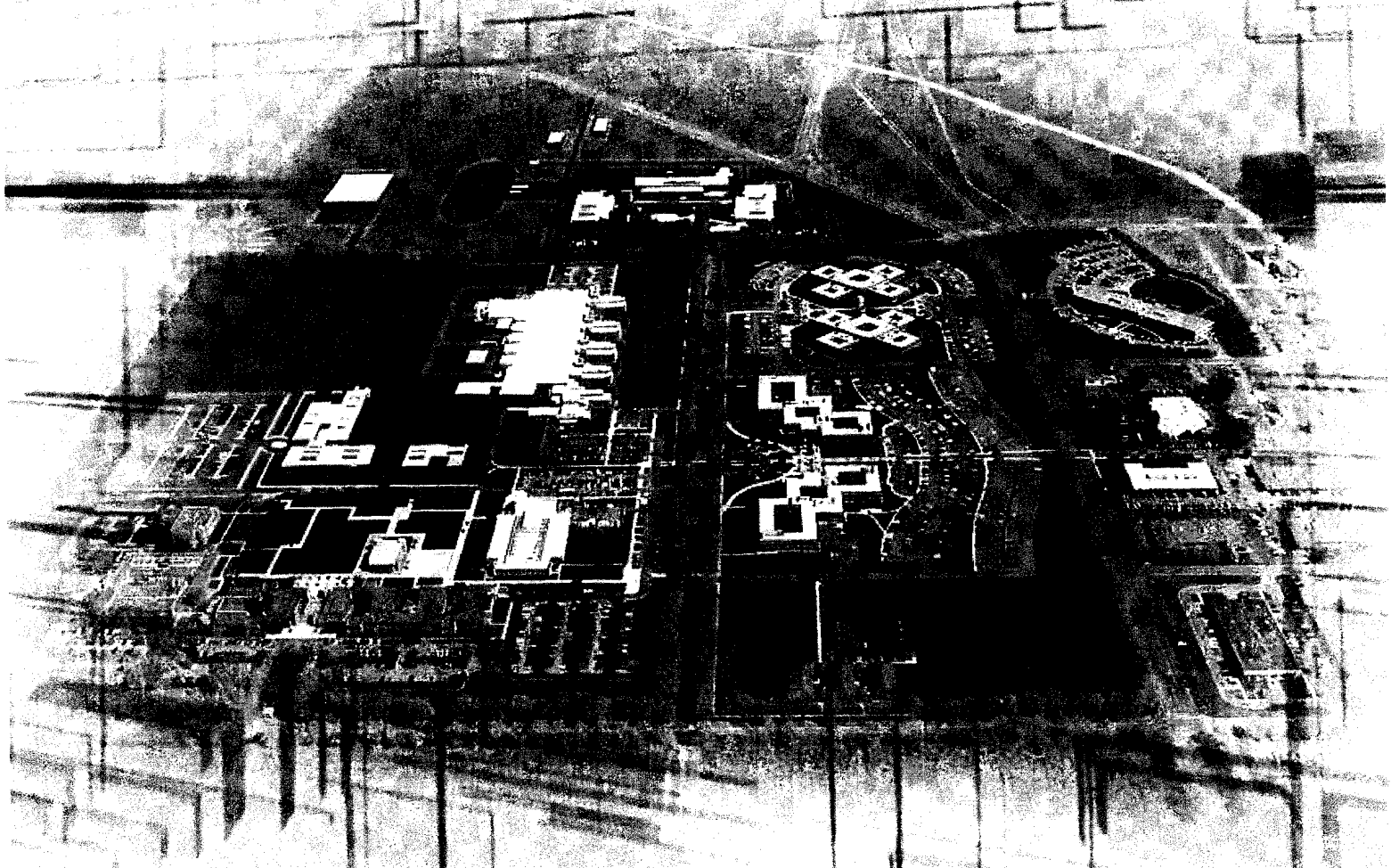
Pacific Northwest National Laboratory

Ten Year Site Plan



June 2007

Prepared for the U.S. Department of Energy
under Contract DE-AC05-76RL01830

Pacific Northwest National Laboratory
Operated by Battelle for the U.S. Department of Energy

Office of Science
U.S. DEPARTMENT OF ENERGY

DISCLAIMER

PACIFIC NORTHWEST NATIONAL LABORATORY
operated by
BATTELLE
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under Contract DE-AC05-76RL01830

Pacific Northwest National Laboratory

Ten Year Site Plan

June 2007

Prepared for
the U.S. Department of Energy
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Pacific Northwest National Laboratory
Richland, Washington 99352

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(Note – Table of Contents organization based on Ten Year Site Plan guidance.)

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A Executive Summary

Introduction

The purpose of this Ten Year Site Plan (TYSP) is to provide the U.S. Department of Energy Office of Science (DOE-SC) a single, comprehensive plan that describes how the real property assets of Pacific Northwest National Laboratory (PNNL) will be managed, maintained, and enhanced to support the DOE strategic plan, the Secretary of Energy's 5-year planning guidance, and the DOE-SC annual program direction and guidance. This TYSP is prepared in response to DOE Order 430.1, *Real Property Asset Management*, and supports the preparation of DOE's Asset Management Plan, a requirement of Executive Order 13327, *Federal Real Property Asset Management* (February 2004).

Vision and Mission Activities

PNNL was created in 1965 and has a broad focus in energy security, national security, and the environment. In its early days, PNNL brought nuclear science and engineering expertise to the surrounding U.S. Department of Energy (DOE) Hanford Site to support projects focused on designing reactors, fabricating reactor fuel, and protecting the environment. Since then, PNNL has evolved into a leading multi-disciplinary national laboratory providing scientific discoveries and developing innovative technologies under DOE-SC.

PNNL has one of the more diverse and balanced portfolios of the DOE-SC laboratories, providing significant support to all four DOE research strategic themes. PNNL's foundational scientific capabilities in environmental and molecular sciences and its long history in nuclear science and process engineering have enabled it to provide innovative technology solutions to key national challenges including, most recently, those associated with terrorist threats and energy security. A cornerstone of PNNL's activities is the William R. Wiley Environmental Molecular Sciences Laboratory (EMSL), a DOE-SC national scientific user facility that provides unique resources to the scientific community to both enable innovative research and to educate the next generation of scientists.

PNNL delivers its capabilities to produce outcomes in mission areas that align with DOE's Strategic Themes. Specific contributions have been defined for each theme that articulate science and technology goals PNNL will deliver. In particular, PNNL is pursuing major activities in predictive biological and environmental science, nanoscale control of chemical processes and materials synthesis, threat detection and prevention, and transformational energy science and technology.

PNNL was created in 1965 and has a broad focus in energy security, national security, and the environment... and has one of the more diverse and balanced portfolios of the DOE-SC laboratories, providing significant support to all four DOE research strategic themes.

...is pursuing ...activities in ...ive biological ...vironmental ..., nanoscale ...l of chemical ...es and ...als synthesis, ...detection and ...ion, and ...rmational ...cience and ...logy.

PNNL has six core competencies that provide the science and technology basis to delivery against these goals. These core competencies, and the mission areas they support, are the foundation for defining PNNL's real property asset needs over the 10-year planning horizon.

PNNL is projecting that DOE's missions will require additional research supported by PNNL's physical sciences core competencies, especially *analytical and interfacial chemical and material sciences* and *radiological sciences*. PNNL's core competency in *sensing and measurement technology* is also expected to increase, principally in support of DOE's Energy and National Security themes. PNNL's *information analytics and visualization* core competency is expected to be needed to support all areas of research. Demand for PNNL's *environmental sciences* and *microbial and cellular biology* core competencies are in line with DOE program projections, with the environmental sciences core competency decreasing for select DOE Office of Environmental Management (DOE-EM) projects. User requirements for EMSL capabilities are expected to push or exceed the limits of EMSL's existing infrastructure.

Demand for the physical sciences will require enhanced laboratory space with appropriate infrastructure and ventilation systems beyond what is available within the current infrastructure. Systems development research will require large-equipment development space, secure clean rooms, and electronics space – a significant portion of which is in facilities nearing end of life. In general, computing space, both secure and open, will be needed to address all mission elements. Average staff growth over the 10-year planning horizon is projected to be 1.3% per year, growing from 4,196 staff at the start of fiscal year (FY) 2007 to 4,812 at the end of FY 2018. Overall, PNNL anticipates that its activities will result in a transition in its research portfolio to a greater focus on scientific discovery and innovation and energy security.

Real Property Assets

PNNL's current portfolio of facilities and infrastructure is unique as a result of its history. It consists of federally owned, older facilities on the Hanford Site, the DOE-SC-owned EMSL, contractor-owned facilities adjacent to the EMSL, leased facilities constructed on contractor-owned land, and other leases both adjacent to and somewhat distant from PNNL's main campus.

Table A.1 provides a summary of the location/category, sizes, and number of buildings that comprise PNNL's current facilities. PNNL occupies 32 DOE-owned buildings. Most of these are older facilities, located in the 300 Area, with only one facility, EMSL, co-located with Battelle-owned facilities in the core campus area. Compared to other national laboratories, PNNL currently relies much more heavily on leased and private space.

TableA.1. PNNL Facilities by Type as of May 2007

Location/Category	Area (millions sq ft)	Number of Individual Buildings
DOE-Owned (Hanford Site)	0.554	31
DOE-Owned (EMSL)	0.209	1
Battelle-Owned (Richland)	0.450	33
Battelle-Owned (Sequim)	0.043	9
Leased Facilities	0.776	23
Other	0.053	4[(a)]
Total	**2.085**	**101**

(a) Represents non-DOE or Battelle-owned space that is occupied on a short-term arrangement with no signed lease (i.e., Interlaboratory Agreements). See Section D13 and Attachment 2 for further detail.

DOE = U.S. Department of Energy.

EMSL = William R. Wiley Environmental Molecular Sciences Laboratory.

PNNL's strat... ensure alignm... its facilities and... infrastructure ... capability and... mission require... improve the qu... its real proper... effectively ma... portfolio of asse...

Real Property Asset Strategy

In line with DOE's Real Property Asset Management Plan, PNNL's strategy is to ensure alignment of its facilities and infrastructure with capability and mission requirements, improve the quality of its real property, and effectively manage its portfolio of assets. PNNL's strategic facility goals over the 10-year planning horizon are to:

- Effectively ***transition*** mission-essential ***capabilities*** impacted by Hanford cleanup of the ***300 Area*** into new or existing facilities, allowing disposition of Hanford Site legacy facilities.

- Provide ***non-300 Area*** research laboratory space sufficient to meet current and future programmatic ***mission requirements***, while improving the alignment of existing facilities to research capabilities and missions.

- Operate, maintain, and expand the ***EMSL*** to meet user community needs now and in the future.

- ***Manage real property assets*** to achieve DOE's strategic goals for utilization, condition, and energy performance—and, through enhanced cost performance, allow reinvestment in PNNL's facilities and infrastructure.

300 Area Capability Transition. PNNL's first priority is to effectively deliver all activities necessary to transition mission-essential capabilities impacted by 300 Area cleanup into new or existing facilities, allowing cleanup in the FY 2008–FY 2011 timeframe. This activity, called the Capability Replacement Laboratory (CRL) Project, includes retaining and upgrading four facilities in the 300 Area, constructing replacement facilities on land south of existing 300 Area facilities, and constructing two, third-party facilities on private

...'s first priority ...uccessfully ...the CRL ...to house the ...n-critical ...ities being ...ed by ...rea closure.

land. Deputy Secretary Clay Sell approved a Critical Decision-1 Revised (CD-1R) for this project December 2006, and Critical Decision-2 (CD-2) was received June 2007.

The line item funding portion of the CRL project, called the Physical Sciences Facility (PSF) Project, includes new facility construction on the PNNL Site and life extension for the existing 325 Building (the Radiochemical Processing Laboratory). Life extension for the other 300 Area facilities will be accomplished through a combination of General Plant Project (GPP) and Institutional General Plant Project (IGPP) investments. A significant investment is also being made from Laboratory overhead resources to effectively transition capabilities, improve PNNL's operating models, and provide infrastructure (See Table A.2).

Overall, these actions will allow PNNL to exit over 370,000 gross square feet (gsf) of aging infrastructure on the Hanford Site. Nearly 150,000 gsf of this has been exited to date, with the remainder (non-retained) to be exited by FY 2011. PNNL also intends to exit approximately 60,000 gsf of non-core leased facilities to better co-locate PNNL research capabilities on the main campus and approximately 20,000 gsf of Battelle private facility space to streamline management of Battelle facilities.

Non-300 Area Mission Requirements. In addition to the actions being taken to replace the 300 Area facilities, a complementary set of actions to accommodate mission/customer requirements in non-300 Area facilities is also underway. The State of Washington is constructing the Bioproducts, Sciences, and Engineering Laboratory (BSEL), a facility that will be jointly shared by Washington State University and PNNL. Research in this facility will principally focus on research to support Energy Security. PNNL is also constructing a small general-purpose research facility and an office expansion to EMSL to address near-term overcrowding. Longer term, PNNL has proposed a System Development Laboratory (SDL) that replaces aging leased facilities that are inadequate for future research programs and are distant from the main campus. PNNL is also exploring other facility options including other program-funded facilities, state-funded facilities, or private investment to address an expected laboratory space shortfall in the 5- to 10-year time horizon. Table A.2 summarizes these ongoing and planned actions.

EMSL. PNNL is currently meeting or exceeding goals for the DOE-SC-owned EMSL for Asset Condition Index (ACI) at 1.0 (excellent), Asset Utilization Index (AUI) at 100%, and Maintenance Investment Index (MII) at 2%. PNNL will continue to meet these goals through the time horizon of this TYSP. In addition, several actions are under way to ensure that EMSL continues to support user needs. In the near term, programmatic investment will provide small expansions including computer space, mechanical systems, and a radiological annex. As part of its planning efforts over the 10-year time horizon, PNNL has proposed a programmatically funded North Laboratory expansion to provide

advanced shielding and vibration and temperature controls to support the next generation of highly sensitive instrument systems.

Real Property Management. Over the past 5 years, PNNL has achieved a 20% reduction in its buildings and utilities costs on a per-research full-time equivalent (FTE) basis. Factors that have contributed to this include reduced energy consumption, reduced operating costs, and improved space utilization. Going forward, PNNL is planning several actions to continue to enhance its management performance. This includes implementing new operating models as part of 300 Area transition activities, improving leasing strategies to reduce costs, and improving energy efficiency. PNNL also intends to optimize its use of leased space to both meet mission requirements and manage costs. The SDL is a key part of that strategy. PNNL is continuing to look at ways to improve energy performance, including providing new facilities that are sustainable and energy efficient. These and other actions are expected to provide cost savings to allow reinvestment in laboratory infrastructure to match DOE-SC strategy.

PNNL is planning several actions to continue to enhance its management performance, including implementing new operating models as part of 300 Area transition activities, improving leasing strategies to reduce costs, and improving energy efficiency.

Conclusion

PNNL faces significant challenges caused by Hanford cleanup, the current needs of mission customers, and changing mission customer needs over the next 10 years. PNNL's first priority is to successfully deliver the CRL project to house the mission-critical capabilities being displaced by 300 Area closure. PNNL will also ensure that its entire facility and infrastructure portfolio aligns with capability and mission requirements, meets quality requirements, and is managed effectively. This facilities and infrastructure plan will enable PNNL to perform basic and applied research to deliver scientific innovation, energy security, environmental security, and national security for the nation.

Table A.2. PNNL's Ongoing or Planned Facilities and Infrastructure Projects

Facility	Funding Source	Estimated Acquisition Cost	Project New Construction (gsf)	Occupancy Year (FY)	Phase per Order DOE O 413.3
Capability Replacement Laboratory (CRL)					
Physical Sciences Facility (PSF) Life Extension 325 Building	Federal Line Item (SC, NNSA, DHS)	$224M (PSF RPV $194M)	201K (PSF)	2011	Execution
Biological Sciences Facility (BSF) Computational Sciences Facility (CSF)	Private – Third Party	Lease	74K (BSF) 74K (CSF)	2009	Execution
Life Extension 331, 318, 350 Building	Small project (GPP/IGPP/Overhead)	$8M	N/A	N/A	Execution
Transition and Infrastructure activities	Laboratory Overhead	$32M	N/A	N/A	Execution
Infrastructure	Washington State and DOE-EM	$5M, $12M	N/A	N/A	Execution
Non-CRL Facilities and Infrastructure Actions – Today to FY 2012					
Bioproducts, Sciences, and Engineering Laboratory (BSEL)	Washington State	$24M (PNNL lease)	57,000 (31,000 PNNL)	2008	Execution
Multiple – Office expansion and small research facility	General Plant Projects	$10M	25,000	2008-2009	Execution
EMSL expansions (Rad Annex, computer, and mechanical)	Programmatic small projects	$15M	19,000	2010-2012	Initiation
Facilities and Infrastructure Actions – FY 2012 to FY 2018					
EMSL North Lab Addition	Federal Line Item - BER	$30M	55,000	2014	Initiation
System Development Laboratory (SDL)	Federal Line Item - SLI	$90M	150,000	2015	Initiation
Multiple – Laboratory rehab/small expansion	Laboratory Investment (IGPP/Overhead)	$25M	30,000	multiple	Initiation
Multiple – Support Facility Infrastructure	Laboratory Investment (IGPP/Overhead)	$13M	25,000	multiple	Initiation
Utilities, Roads, Grounds	Laboratory Investment (IGPP/Overhead)	$14M	N/A	N/A	Initiation
Laboratory Space - Gap	*tbd*	*~$40M*	*~70,000*	*tbd*	*Initiation*

BER = DOE Office of Science Biological and Environmental Research program.
DOE-EM = U.S. Department of Energy Office of Environmental Management.
DHS = Department of Homeland Security.
EMSL = William R. Wiley Environmental Molecular Sciences Laboratory.
FY = Fiscal year.
gsf = Gross square feet.
GPP = General Plant Project.
IGPP = Institutional General Plant Project.
N/A = Not applicable.
NNSA = National Nuclear Security Administration.
PNNL = Pacific Northwest National Laboratory.
RPV = Replacement plant value.
SC = DOE Office of Science.
SLI = Scientific Laboratory Infrastructure.
tbd = To be determined.

B Overview of Site Facilities and Infrastructure

Pacific Northwest National Laboratory (PNNL), operated by Battelle for the U.S. Department of Energy (DOE), is a multi-program national laboratory (Figure B.1) that provides the scientific and technical basis to predict behavior of complex systems, prevent the proliferation of weapons of mass destruction and acts of terrorism, sustain a healthy environment, and reduce U.S. dependence on imported oil. The total laboratory population of PNNL is 4,196 as of October 1, 2006.

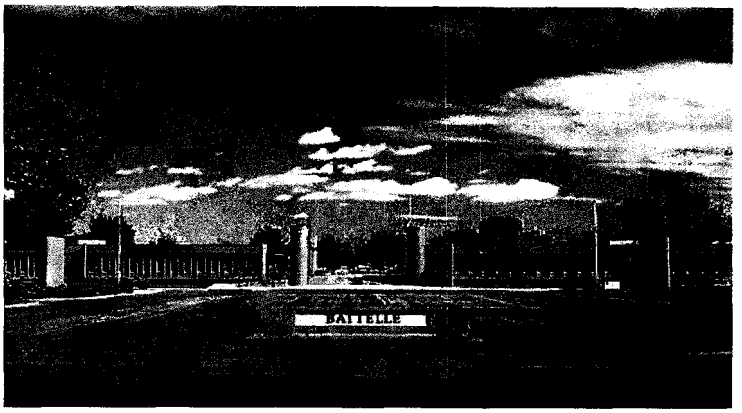


Figure B.1. PNNL is Operated by Battelle for the U.S. Department of Energy

PNNL was established in as part of a reconfiguration DOE's Hanfo in Richland, Washington.

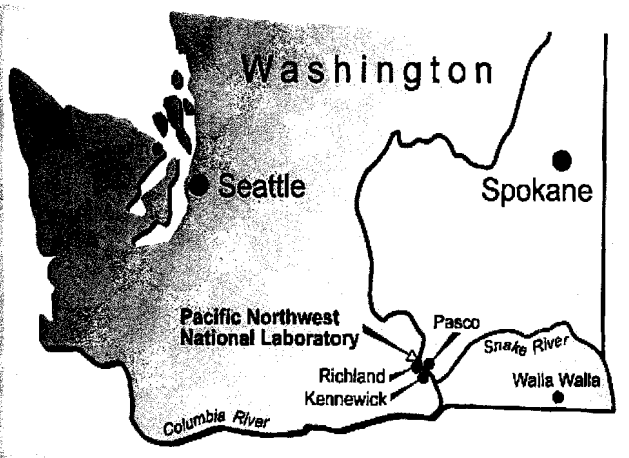
Battelle, which is headquartered in Columbus, Ohio, is a global science and technology enterprise that develops and commercializes technology and manages laboratories for customers.

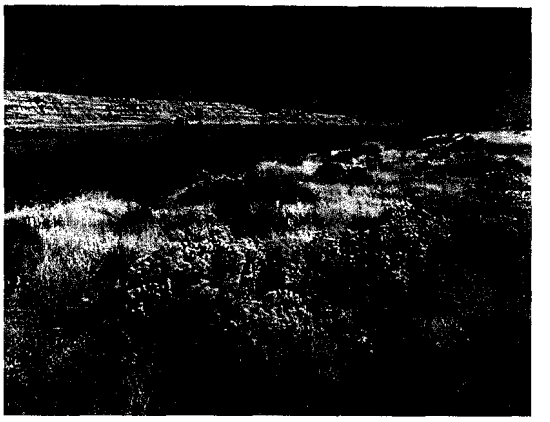
Location

PNNL is located in Richland, Washington (Figure B.2), with offsite locations in Sequim, Washington; Seattle, Washington; Portland, Oregon; Washington, D.C.; and the University of Maryland. The main PNNL campus is located on the north end of the city of Richland, south of the Hanford Site, and within one mile of Washington State University's branch campus.

History

PNNL was established in 1965 as part of a reconfiguration of DOE's Hanford Site in Richland, Washington. Its forerunner, the Hanford Laboratories, was part of the World War II Manhattan Project (Figure B.3). PNNL has evolved from a nuclear engineering laboratory dedicated to Hanford operations to a full-fledged multi-program laboratory focused on scientific discovery and the translation of discoveries into technical solutions to meet national needs. The Laboratory's current strengths in microbial and cellular biology and applied proteomics,





Columbia River

Figure B.2. PNNL is Located in Richland, Washington, Along the Columbia River

environmental sciences, analytical and interfacial chemical and materials sciences, radiological sciences, information analytics and visualization, and sensor and measurement technology are key to PNNL's delivery of its research to meet DOE's missions.

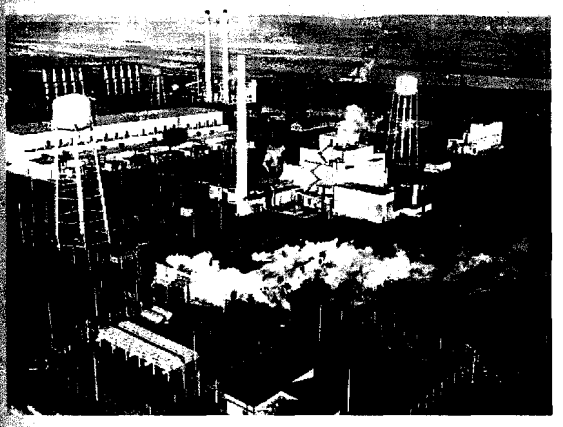


Figure B.3. Plutonium-Producing Reactors, December 17, 1944

PNNL's first facilities were those in the Hanford Works 300 Area that were transitioned to the Laboratory when it was established in 1965. Battelle, as a result of winning the first operating contract for the Laboratory, constructed numerous private facilities on Battelle-owned property south of the 300 Area at the northern end of the City of Richland. Both DOE and Battelle have constructed additional facilities since the Laboratory was first established. Battelle has also facilitated the construction of third-party leased facilities on Battelle land. Other leased facilities have been added to the portfolio as older facilities in the 300 Area have been exited and the Laboratory has grown.

Since 1965, the allocation of facilities space among DOE-owned, Battelle-owned, and leased facilities has changed significantly. Today, DOE-owned facilities represent only 37% of total gross square feet (gsf), as shown in Figure B.4.

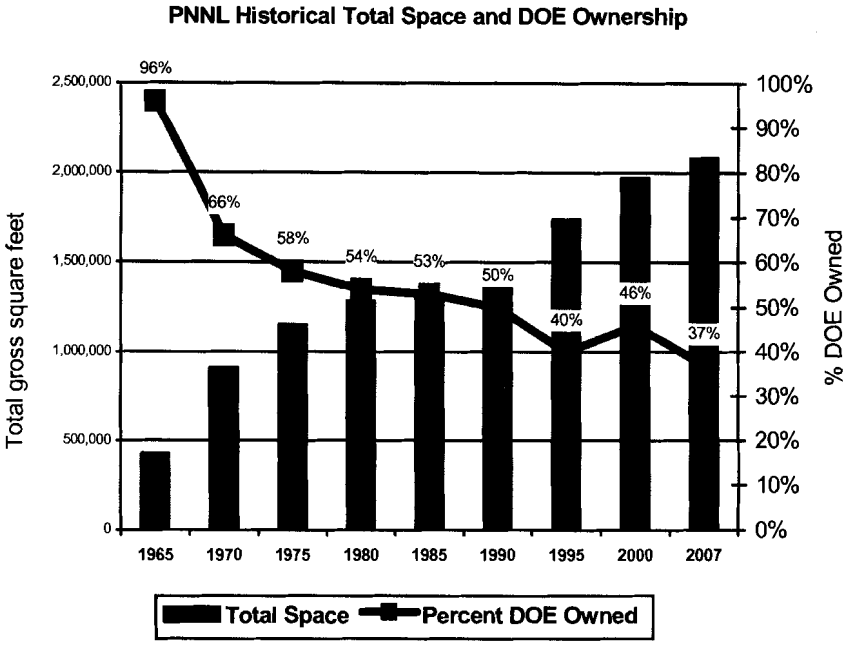


Figure B.4. PNNL Historical Total Space and the Percent of Spaced Owned by DOE

Facility Assets and Ownership

PNNL's current campus encompasses land owned by DOE, Battelle, and third-parties. Facilities on the PNNL campus are composed of:

PNNL's current campus encompasses land owned by DOE, Battelle, and third-parties.

- federally owned buildings on the Hanford Site (principally in Hanford's 300 Area)
- federally owned buildings on the PNNL Site currently controlled by DOE's Office of Science (DOE-SC)
- buildings owned by Battelle on Battelle land
- leased buildings on Battelle land
- other leased buildings within the north Richland area
- multiple offsite locations.

The DOE-designated PNNL Site is at the very north end of the City of Richland and consists of DOE-owned property occupied by the William R. Wiley Environmental Molecular Sciences Laboratory (EMSL) south of Horn Rapids Road (30 acres), vacant property north of Horn Rapids Road between Stevens Drive and George Washington Way, known as the Horn Rapids Triangle (100 acres), and land between the north edge of the Horn Rapids Triangle and 300 Area

(220 acres). The total of this area is ~350 acres with the Horn Rapids Triangle being the home of future federal buildings (see Figure B.5).

The balance of the PNNL campus, exclusive of the Hanford Site and the DOE-designated PNNL Site, is composed of approximately 250 acres of land owned by Battelle and occupied by both Battelle facilities and third-party-leased facilities. This is considered part of the core of the campus. PNNL also occupies leased facilities on land owned by third parties. This space is considered flexible space that can be adjusted as requirements change. Attachment 2 provides a complete inventory and maps of buildings, and Attachment 3 provides a complete inventory and maps of infrastructure/site utility systems.

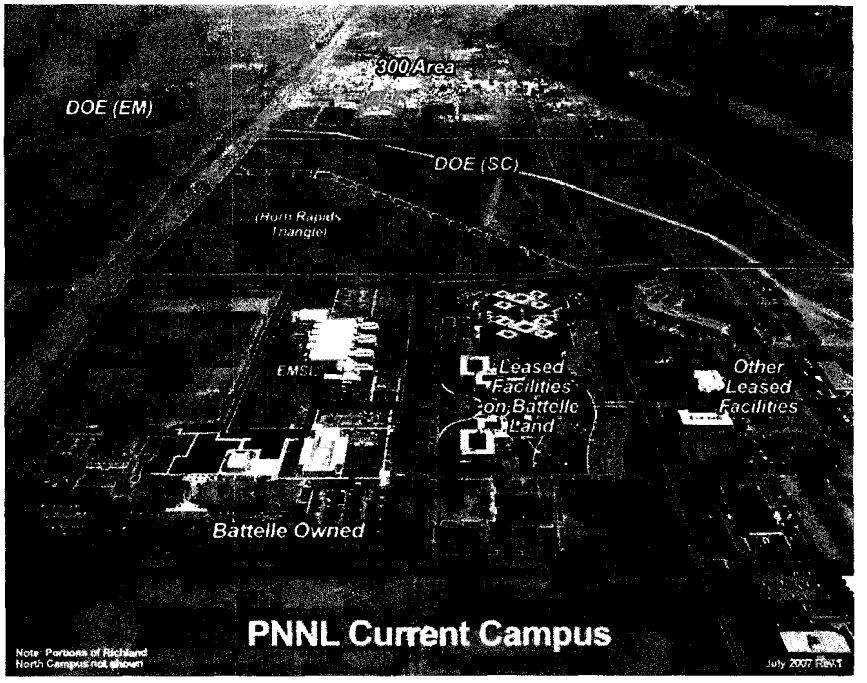


Figure B.5. Existing PNNL Campus in 2007

NNL campus ique array of s differing in ndition, and hip. The t PNNL gross foot portfolio nts 37% DOE 24% Battelle 37% leased es, and 2%

The PNNL campus consists of a unique array of facilities differing in age, condition, and ownership. The current PNNL gross square foot portfolio represents 37% DOE owned, 24% Battelle owned, 37% leased facilities, and 2% other. Table B.1 provides details on facility ownership and sizes.

The 300 Area, shown in Figure B.5, is the northernmost part of the PNNL campus and the facilities are entirely DOE Office of Environmental Management (DOE-EM) owned with the exception of the 361 mobile facility, which is owned by the National Nuclear Security Administration (NNSA). The other federally owned facility operated by PNNL is the EMSL, owned by DOE-SC, and located in the middle of the PNNL campus. The remaining facilities are multiple Battelle-owned and various leased facilities. Table B.1 provides a distribution of the PNNL facilities by ownership.

Table B.1. PNNL Facilities by Type as of May 2007

Location/Category	Area (millions sq ft)	Number of Individual Buildings
DOE-Owned (Hanford Site)	0.554	31
DOE-Owned (EMSL)	0.209	1
Battelle-Owned (Richland)	0.450	33
Battelle-Owned (Sequim)	0.043	9
Leased Facilities	0.776	23
Other	0.053	4[(a)]
Total	**2.085**	**101**

(a) Represents non-DOE or Battelle-owned space that is occupied on a short-term arrangement with no signed lease (i.e., Interlaboratory Agreements, Shared Services Agreements, etc.; see Section D13, Leased and Third-Party Facilities).
DOE = U.S. Department of Energy.
EMSL = William R. Wiley Environmental Molecular Sciences Laboratory.

The DOE-owned portion of PNNL represents approximately 37% or 763,000 gross square feet of the total approximately 2,085,000 gross square feet ava

Over the past 3 years, the PNNL campus has been reshaped significantly as a result of efforts to exit aging facilities in Hanford Site's 300 Area to allow for accelerated cleanup. Table B.2 shows a comparison between October 2003 when this activity began and October 2006. Over this time period, the Laboratory exited 149,000 square feet of older facilities in the 300 Area, slightly reduced total campus footprint, but increased staff count by 8.5%.

Table B.2. PNNL Baseline Prior to Initiating 300 Area Exit for Accelerated Cleanup

Location/Category	Baseline October 2003 Area (millions sq ft)	October 2006 Area (millions sq ft)
DOE-Owned (Hanford Site)	0.703	0.554
DOE-Owned (EMSL)	0.200	0.209
Battelle-Owned	0.499	0.493
Leased	0.660	0.776
Other	0.033	0.053
Total	**2.095**	**2.085**
Staff	**3,868**	**4,196**
Sq ft/Staff[(a)]	**516**	**473**

(a) Calculation excludes staff and space occupied by others.
DOE = U.S. Department of Energy.
EMSL = William R. Wiley Environmental Molecular Sciences Laboratory.

Facility Condition and Age

The federal facilities located on the PNNL campus vary in age and condition. Figures B.6 and B.7 provide a summary of DOE-owned space by type, condition, and age for all DOE facilities inclusive of Hanford Site Facilities. PNNL's DOE-owned facilities represent approximately 37%, or 763,000 gsf of the total approximately 2,085,000 gsf available (see Table B.1). The total replacement plant value (RPV) of all facilities is detailed in Section D6.

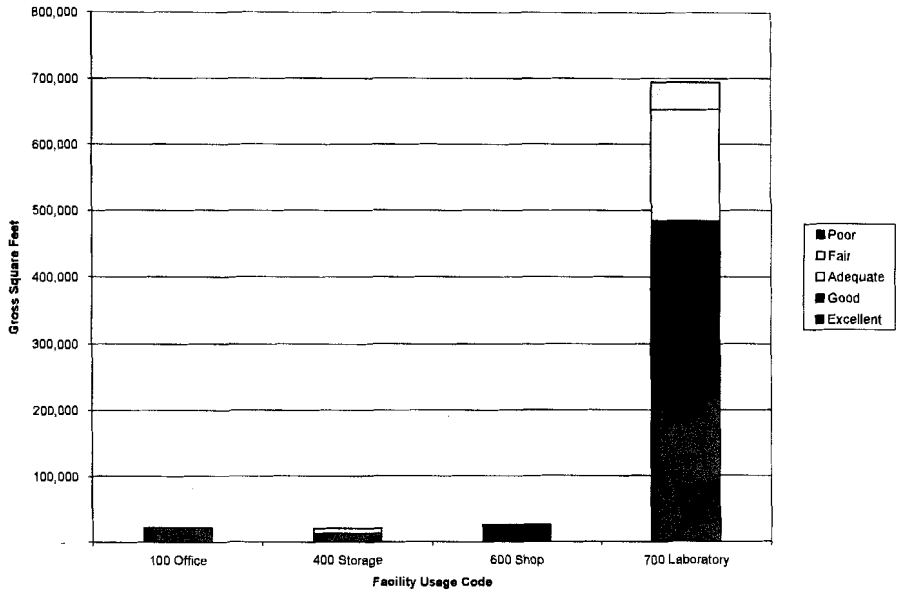


Figure B.6. PNNL Current Distribution of DOE Real Property Condition by Usage Code

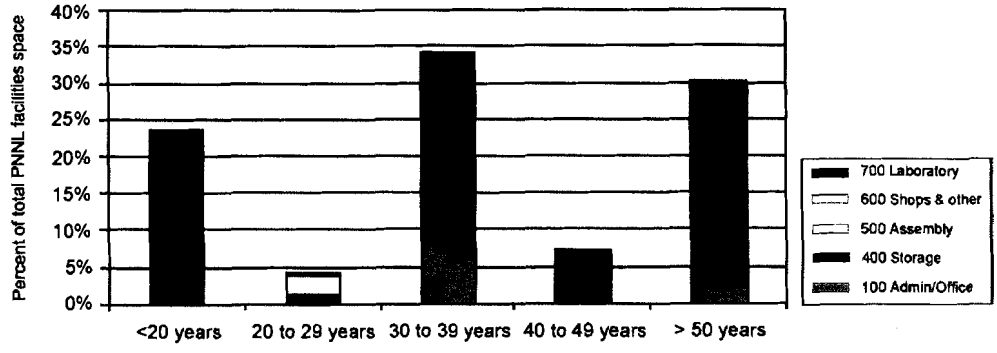


Figure B.7. PNNL Current Distribution of DOE Real Property by Age

...Research ...orates are the ...y users of the ...ties...However, ...sponsibility to ...operate, and ...e the ...ual facilities is ...ated from an ...Laboratory ...tive...

General Alignment of Facilities with Research Program

PNNL Research Directorates (divisional organizations) are the primary users of the facilities in their quest to meet the Laboratory's missions and deliver its research results. However, the responsibility to fund, operate, and manage the individual facilities is coordinated from an entire Laboratory perspective and not on a directorate-by-directorate or program-by-program basis. PNNL's Facilities and Operations Directorate has this coordination responsibility. This results in a distribution of research programs across the campus, and does not generally yield a facility-to-facility dedication to a particular research program. Therefore, PNNL does not consolidate individual research programs (for one customer) into one facility. The work for individual clients becomes distributed to facility space that is most appropriate to support the research needs.

PNNL facilities consist of 101 individual buildings as shown in Table B.1. Federal facilities consist of the Environmental Molecular Sciences Laboratory (EMSL; Figure B.8) and other facilities on the Hanford Site.

William R. Wiley Environmental Molecular Sciences Laboratory (EMSL)

The EMSL building is the centerpiece of the PNNL research campus and a 209,000-gsf national scientific user facility with advanced resources for fundamental research on physical, chemical, and biological processes. This facility was constructed in 1997 with an estimated RPV of $80 million excluding research equipment. EMSL houses state-of-the-art research equipment, including a new high-performance supercomputer and a 900-Mhz, high-field nuclear magnetic resonance spectrometer, as well as mass spectrometry and surface-science instruments. PNNL's Asset Utilization Index (AUI) for EMSL is 1 (excellent). PNNL continues to conduct maintenance activities at EMSL within the DOE goal of more than 2% RPV, with a planned Maintenance Investment Index (MII) of 2.0% to 2.7% over the next 10 years. The Deferred Maintenance (DM) total in FY 2007 for EMSL was 0; thus the Asset Condition Index (ACI) is 1 (excellent).

The EMSL building is the centerpiece of the PNNL research campus as a 209,000-gross-square-feet national scientific user facility with advanced resources for fundamental research on physical, chemical, and biological processes.

Figure B.8. William R. Wiley Environmental Molecular Sciences Laboratory

Other Federally Owned Facilities

Evolving this year from the Capability Replacement Laboratory (CRL) Project, a number of facilities that are DOE-EM owned and located within the Hanford Site 300 Area are planned for life extension of 20 years. Maintenance expenditures for these buildings in the past several years, while maintaining minimum safe operational and mission-ready conditions, have been consistent with the original 300 Area Accelerated Closure Plan, which established 2009 as the date by which PNNL was to have vacated all 300 Area DOE-EM-owned facilities it occupies. Under the plan to retain select facilities, actions to clearly define and implement

DOE-EM and DOE-SC roles and responsibilities around 300 Area operations are under way, and a maintenance and operations strategy consistent with these roles will be adopted. Maintenance and operations activities, and resulting indices such as ACI and MII, are in the process of being modified to reflect this new approach. PNNL's strategic intent is that these retained facilities will be maintained and operated to meet mission requirements for the planned 20-year period.

C Current and Future Missions for the Site

PNNL performs basic and applied research to deliver energy, environmental, and national security for the nation. DOE's *Department of Energy Laboratory Plans FY 2008-FY 2012* document presents a concise summary of the current and future science and technology at PNNL. This section of the TYSP is largely based on PNNL's Laboratory Plan and complementary information that supports long-term facilities and infrastructure planning. Also presented here is an overview of the evolving mission of PNNL, as well as PNNL's core competencies, business lines, and distinguishing characteristics.

PNNL has evo... into a leading m... disciplinary nat... laboratory provi... scientific disco... and developing ... innovative ... technologies un... DOE's Office o... Science.

PNNL has evolved into a leading multi-disciplinary national laboratory providing scientific discoveries and developing innovative technologies under DOE's Office of Science (DOE-SC). PNNL's mission focus is on the biological, chemical, computational, environmental, and materials sciences; technologies to detect and mitigate weapons of mass destruction and counter acts of terrorism; and technologies for energy and environmental security. PNNL also operates the William R. Wiley Environmental Molecular Sciences Laboratory (EMSL), a national scientific user facility dedicated to providing integrated experimental and computational resources for discovery and technological innovation in the environmental molecular sciences to support the needs of DOE and the nation.

PNNL's vision ... be recognized ... worldwide and ... valued regionall... leadership in ra... translating disc... into solutions...

PNNL's vision is to be recognized worldwide and valued regionally for leadership in rapidly translating discoveries into solutions for challenges in energy, national security, and the environment by integrating the chemical, physical, and biological sciences. PNNL maintains core competencies in order to deliver valuable science and technology to a diverse customer set. *Core competencies* are the skills and capabilities that differentiate an organization from alternative providers of their products and services, and afford them a competitive advantage. Six core competencies underpin activities at PNNL:

1. Microbial and cellular biology and applied proteomics
2. Environmental sciences in biogeochemistry, climate physics and atmospheric science, subsurface science, and integrated assessment of energy and environmental impacts
3. Analytical and interfacial chemical and materials sciences
4. Radiological sciences
5. Information analytics and visualization
6. Sensing and measurement technologies and systems, for energy, national security, and environmental applications

delivers its ilities to outcomes in areas that with DOE's c themes.

s business re aligned with uishing ilities, which a basis for e teaming and ring with other laboratories, sities, and sector ers in pursuit of boratory

PNNL delivers these competencies to produce outcomes for each of DOE's Strategic Themes. Specific contributions have been defined for each theme that articulate the science and technology goals PNNL will deliver.

Business Lines – Alignment with DOE Strategic Themes

PNNL business lines are structured to align with DOE's Strategic Themes. These business lines are described in Table C.1 and show PNNL's distinguishing capabilities that support each line and provide a basis for effective teaming and partnering with other DOE laboratories, universities, and private-sector partners in pursuit of the Laboratory mission. These business lines and the distinguishing capabilities provide an additional window into the mission focus and unique contributions and strengths of PNNL and its role within the DOE-SC laboratory complex. Items in italics within the column, Distinguishing Capabilities, identify research facilities that convey particular, strategic strengths and capabilities to PNNL. Items in italics within the Mission Relevance column describe anticipated requirements for PNNL's core competencies.

For the business line of Foundational Science, the primary customers are DOE-SC, specifically Biological and Environmental Research, Basic Energy Sciences, and Advanced Scientific Computing Research. Secondary sponsors include the National Institute for General Medical Sciences and the National Heart, Lung and Blood Institute.

For Energy Science and Technology, the third largest business line, primary customers are DOE's Offices of Energy Efficiency and Renewable Energy (DOE-EERE), Fossil Energy, Nuclear Energy; secondary customers include the National Aeronautics and Space Administration (NASA), the U.S. Nuclear Regulatory Commission, and private industry.

Typical of multi-program laboratories, PNNL supports work for several customers in addition to DOE-SC. For the National and Homeland Security business line, the primary customers are DOE's National Nuclear Security Administration (NNSA), the Department of Homeland Security, the Department of Defense, and the intelligence community. In particular, NNSA contributes significant resources to PNNL to develop next-generation threat detection and preventions systems in support of nuclear nonproliferation. Secondary customers include the National Institute for Allergies and Infectious Diseases and private industry. The advanced analytical capabilities in EMSL are an essential resource for this business line, and PNNL brings particular capabilities to bear including decades of expertise in the technical aspects of nuclear materials production and detection (e.g., the nuclear fuel cycle; weapons material production; environmental monitoring; transuranic waste management; and safeguards, detection, and measurement technologies), as well as in such complex social and technical matters as economic diversification and international relations.

Table C.1. Description of PNNL Business Lines

PNNL Business Lines *DOE Strategic Theme*	Distinguishing Capabilities	Distinguishing Performance	Mission Relevance *Competency Need*
Foundational Science ***Scientific Discovery and Innovation***	• **Environmental microbiology and biogeochemistry;** • **Field-scale subsurface research;** • **Climate physics and atmospheric sciences;** • **Chemical physics and analytics;** • Unique suite of Nuclear Magnetic Resonance spectrometers; extensively used ultra high resolution infrared spectra database • **Catalysis and oxide materials;** • **Materials in extreme environments;** • **Computational Chemistry;** • **High performance computing;** • ***Environmental Molecular Sciences Laboratory;*** • ***Life Sciences Laboratory;*** • ***Research Aircraft Facility.***	DOE lead for biogeochemistry; PNNL in the top 1% of institutions in ISI citation rate for chemistry, physics, materials science, engineering, geosciences, environment/ecology and clinical medicine; Fastest time to solution for computational chemistry problems; Scientific leadership and program management/integration as technical director for the DOE Atmospheric Radiation Measurement Program Climate Research Facility; Lead provider of analytical tools, scenario analysis and integrated assessment for DOE's Climate Change Technology program; Over 250 invited book chapters, conference papers, reports and peer reviewed journal articles in last 5 years. Scientific leadership for research on radiation damage to materials.	Fundamental science to advance scientific frontiers and to deliver high-impact, science-based solutions in energy, security and environment *PNNL is anticipating increased need for Analytical and interfacial chemical and materials sciences Core Competency, modest increase in Environmental science – subsurface, and modest increase in Information analytics and visualization*
Energy S&T ***Energy Security***	• **Solid Oxide Fuel Cells;** • **Hydrogen storage and safety;** • **Catalyst and process engineering;** • **Power grid technology;** • *Electricity Infrastructure* • *Operations Center* • *Bioproducts, Sciences and Engineering Laboratory*	DOE's program lead for: Solid State Energy Conversion program; Chemical Hydrogen Storage (co-lead); Bioproducts; GridWise program; and Global climate change technology	Promote clean, secure, reliable and affordable energy *PNNL is anticipating increased need for Analytical and interfacial chemical and materials sciences, sensing and measurement technology, and Information analytics and visualization*

Table C.1. (contd)

PNNL Business Lines *DOE Strategic Theme*	Distinguishing Capabilities	Distinguishing Performance	Mission Relevance *Competency Need*
National and Homeland Security S&T ***National Security***	• **Radiation detection;** • **Radioanalytical chemistry and radiochemical processing;** • **Visual analytics;** • **Critical infrastructure simulation and cyber security.** • ***Ultra-Trace Detection Laboratory*** • ***Radiological Standards Laboratory***	Over 50 years of programmatic funding and leadership in ultra-trace detection; Lead for national Radiation Portal Monitoring project—currently scanning 90% of cargo entering the country and approaching 1,000 sensors deployed; DHS program lead for National Visual Analytics Center; Lead developer of cyber security simulation systems for federal systems.	Reduce proliferation of global nuclear threat and prevent terrorism against the homeland *PNNL is anticipating increased need for Radiological science, sensing and measurement technology, and Information analytics and visualization*
Environmental S&T ***Environmental Responsibility***	• **Subsurface science and contaminate modeling;** • **Chemical and radiochemical process engineering, waste separations and waste forms;** • **Integrated assessment and risk analysis;** • **Environmental and human health and safety** • **Ecological science;** • ***Marine Sciences Laboratory;*** • ***Radiochemical Processing Laboratory;*** • ***Applied Process Engineering Laboratory.***	Published over 250 technical reports and 300 peer reviewed journals since 2000; Largest single provider of S&T for DOE-EM and its contractors; More than 100 patents in environmental science and technology	Predict, assess and cost-effectively mitigate environmental damage and threat *PNNL is anticipating decreased need for Environmental science, increased need for analytical and interfacial chemical and materials sciences, and Radiological science*

DOE = U.S. Department of Energy.
DOE-EM = DOE Office of Environmental Management.
PNNL = Pacific Northwest National Laboratory.
S&T = Science and Technology.

The Environmental Science and Technology business line serves a traditional Environmental Portfolio of DOE's Offices of Environmental Management (DOE-EM; principally supporting EM contractors), Radioactive Waste, and Environmental Health. However, the business line also provides significant critical solutions to the U.S. Environmental Protection Agency (EPA) and the Army Corps of Engineers. Secondary sponsors include NASA, the National Oceanic and Atmospheric Administration (NOAA), and private industry.

Major Science and Technology Activities

PNNL is pursuing the following major scientific and technology activities.

- **Predictive Biological and Environmental Science** – PNNL will predict and design the behavior of complex biological systems including microbial communities for energy production and carbon management and advance the prediction of complex environmental systems including the climate system and subsurface environments.

- **Nanoscale Control of Chemical Processes and Materials Synthesis** – PNNL will develop science and technology to control chemical and physical processes in nanostructured materials to achieve a ten-fold increase in the performance of catalytic processes and materials used in energy and security applications.

- **Threat Detection and Prevention** – PNNL will develop advanced threat prediction, detection, and characterization methods to greatly reduce threats and potential risks associated with weapons of mass destruction and effect.

- **Transformational Energy Science and Technology** – In support of national initiatives and in partnership with private industry when appropriate, PNNL will generate scientific and technology advances in the areas of transportation efficiency, real-time grid control, advanced lighting and fuel cell technologies, and will develop technology and engineering approaches that enable higher energy conversion efficiencies and CO_2 capture and sequestration.

PNNL's major science and technology thrusts and continued deployment of core competencies will serve to deliver the science and technology PNNL customers need to maintain the energy, environmental, and national security of the nation.

PNNL's major science and technology activities and continued deployment of core competencies will serve to deliver the science and technology PNNL's customers need to maintain the energy, environmental, and national security of the nation. In order to continue to deliver on these missions, PNNL must maintain the staff, facilities, and equipment that constitute the core competencies.

Staff Projections and Facilities and Infrastructure Impacts

Mission requirements now and in the future provide the basis for the demand for PNNL's capabilities. The impact to facilities and infrastructure that results from this demand is driven by three principal factors: the magnitude of the demand, the change in research mix that impacts space type, and the ability of existing facilities to meet these requirements.

The projected magnitude of the demand is given in Table C.2, which provides a 10-year forecast of the funding and total staffing at PNNL. The FY 2007–FY 2013 projections are based on PNNL's business planning process that develops Institutional Projections for funding and staffing over a 5-year planning time horizon. The projections for planning years FY 2013–FY 2018 are based on

a linear total staff growth of 60 staff per year. This is consistent with the average growth for the five-year institutional projection and less than the actual average staff growth of 72 staff per year for the previous 5 years. Average staff growth over the 10-year planning period is projected to be 1.3 % per year, growing from 4,196 staff in FY 2006 to 4,812 in FY 2018.

Table C.2. Summary of Expected Program Funding (without capital or construction funding) and Staffing

Funding	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013[a]	FY 2014[a]	FY 2015[a]	FY 2016[a]	FY 2017[a]	FY 2018[a]
Total Funding ($M)	679	790	851	871	919	973	909	950	1,000	1,051	1,105	1,161	1,220
Total Staffing (FTEs)	4,196	4,172	4,242	4,284	4,357	4,403	4,470	4,512	4,572	4,632	4,692	4,752	4,812

(a) The FY 2013–FY 2018 funding forecasts are derived from an estimated year-over-year increase from FY 2012 forecasts based on a 60 staff per year-over-year increase and projected project labor distribution.
FTE = Full-time equivalent.
FY = Fiscal year.

Demand for PNNL's research capability in terms of staff mix is shown in Figure C.1. This figure shows distribution of staffing by core competency for FY 2006 Actual, and projected for FY 2012 and FY 2018.

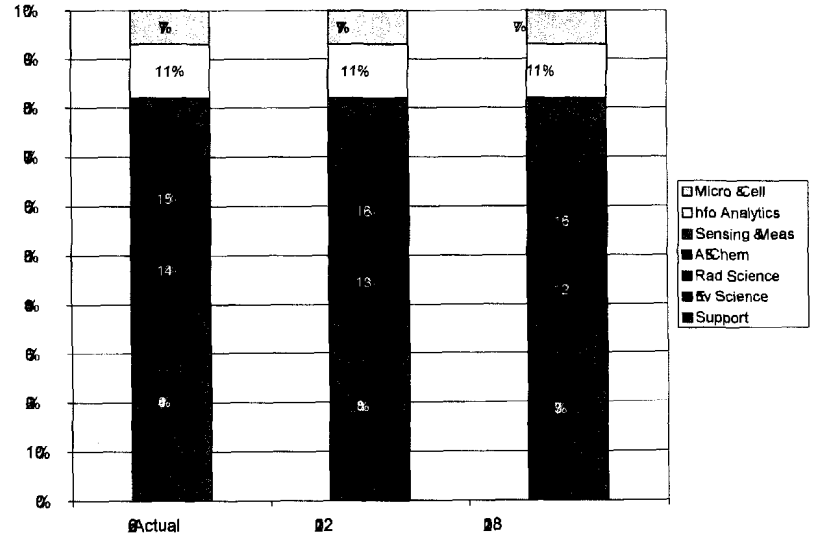


Figure C.1. PNNL Current and Projected Staff Distribution by Core Competency and Function

Demand for PNNL's core competencies in environmental science and microbial and cellular biology is in line with DOE program projections with expected decreases associated with specific DOE-EM projects. Demand for the physical sciences—especially analytical and interfacial chemical and material sciences and radiological sciences—is projected to exceed other capability areas and will require enhanced laboratory space with appropriate infrastructure and ventilation

staff growth ten-year period is to be 1.3 % , growing 196 staff in 006 to 4,812 in 018.

systems beyond what is available within the current infrastructure. Anticipated demand for science-based research is expected to push or exceed the limits of existing EMSL infrastructure, including requirements for shielding, vibration, and temperature control for highly sensitive instrument systems. Sensing and measurement technology and chemical and materials systems development research will require large-equipment development space, clean rooms, and electronics space, a significant portion of which is in facilities nearing end of life. In general, computing space, both secure and open, will be needed to address all mission elements. Overall, PNNL anticipates that its activities will result in a transition in its research portfolio to a greater focus on Scientific Discovery and Innovation and Energy Security themes.

Systems develop research result from PNNL sc discoveries will require large equipment development sp clean rooms, a electronics spac significant portio which is in facil nearing end of

Currently, research to support DOE's Scientific Discovery and Innovation theme is principally performed in the EMSL; however, significant portions are performed in Hanford Site facilities as well as leased and Battelle facilities in the core campus. National security depends significantly on Hanford Site facilities, core facilities, and shorter-term lease arrangements. Energy security is highly dependent on shorter-term lease arrangements, creating a vulnerability as this research grows. PNNL's long-term strategy is to reduce its dependence on shorter-term leased facilities and increase research performed in federally owned facilities.

Table C.3 provides a list of projects both ongoing and planned at PNNL. This table is divided into three categories – the projects and activities necessary to support transition of mission critical capabilities from the Hanford Site 300 Area, other actions under way or planned through FY 2012, and actions planned beyond FY 2012.

PNNL's long-t strategy is to re its dependence o shorter-term lea facilities and i research perfor federally owne facilities.

Capability Replacement Laboratory (CRL) Project – The most significant driver for PNNL facilities and infrastructure is the need to house capabilities being displaced by the accelerated cleanup of the Hanford Site 300 Area. Approximately one-third of PNNL's research is performed in cold-war era facilities in Hanford's 300 Area. These facilities are targeted for accelerated cleanup through DOE-EM's River Corridor Cleanup Contract (RCCC) and must be exited for cleanup to occur. In September 2004, a Mission Need (Critical Decision-0) for the CRL project was approved by Deputy Secretary McSlarrow, and in February 2005, this Mission Need was revalidated. In December 2006, Critical Decision-1 Revised was approved by Deputy Secretary Clay Sell that included retaining and upgrading four facilities in the 300 Area, constructing replacement facilities south of the existing 300 Area on the PNNL site, and constructing two third-party facilities on private land. In June 2007, Deputy Secretary Sell approved Critical Decision-2 (CD-2) establishing the Physical Sciences Facility (PSF) Project performance baseline and delegating follow-on critical decision authority to the Under Secretary for Science. The CRL project actions are summarized in Table C.3.

Table C.3. PNNL's Ongoing or Planned Facilities and Infrastructure Projects

Facility	Funding Source	Estimated Acquisition Cost	Project New Construction (gsf)	Occupancy Year (FY)	Phase per Order DOE O 413.3
Capability Replacement Laboratory (CRL)					
Physical Sciences Facility (PSF) Life Extension 325 Building	Federal Line Item (SC, NNSA, DHS)	$224M (PSF RPV $194M)	201K (PSF)	2011	Execution
Biological Sciences Facility (BSF) Computational Sciences Facility (CSF)	Private – Third Party	Lease	74K (BSF) 74K (CSF)	2009	Execution
Life Extension 331, 318, 350 Building	Small project (GPP/IGPP/Overhead)	$8M	N/A	N/A	Execution
Transition and Infrastructure activities	Laboratory Overhead	$32M	N/A	N/A	Execution
Infrastructure	Washington State and DOE-EM	$5M, $12M	N/A	N/A	Execution
Non-CRL Facilities and Infrastructure Actions – Today to FY 2012					
Bioproducts, Sciences, and Engineering Laboratory (BSEL)	Washington State	$24M (PNNL lease)	57,000 (31,000 PNNL)	2008	Execution
Multiple – Office expansion and small research facility	General Plant Projects	$10M	25,000	2008-2009	Execution
EMSL expansions (Rad Annex, computer, and mechanical)	Programmatic small projects	$15M	19,000	2010-2012	Initiation
Facilities and Infrastructure Actions – FY 2012 to FY 2018					
EMSL North Lab Addition	Federal Line Item - BER	$30M	55,000	2014	Initiation
System Development Laboratory (SDL)	Federal Line Item - SLI	$90M	150,000	2015	Initiation
Multiple – Laboratory rehab/small expansion	Laboratory Investment (IGPP/Overhead)	$25M	30,000	multiple	Initiation
Multiple – Support Facility Infrastructure	Laboratory Investment (IGPP/Overhead)	$13M	25,000	multiple	Initiation
Utilities, Roads, Grounds	Laboratory Investment (IGPP/Overhead)	$14M	N/A	N/A	Initiation
Laboratory Space - Gap	*tbd*	*~$40M*	*~70,000*	*tbd*	*Initiation*

BER = DOE Office of Science Biological and Environmental Research program.
DOE-EM = U.S. Department of Energy Office of Environmental Management.
DHS = Department of Homeland Security.
EMSL = William R. Wiley Environmental Molecular Sciences Laboratory.
FY = Fiscal year.
gsf = Gross square feet.
GPP = General Plant Project.
IGPP = Institutional General Plant Project.
N/A = Not applicable.
NNSA = National Nuclear Security Administration.
PNNL = Pacific Northwest National Laboratory.
RPV = Replacement plant value.
SC = DOE Office of Science.
SLI = Scientific Laboratory Infrastructure.
tbd = To be determined.

The $224 million line item funding for the PSF project consists of $98 million from DOE-SC, $70 million from NNSA, and $56 million from Department of Homeland Security (DHS). This funding supports constructing the PSF on the Horn Rapids Triangle and life extension for the existing 325 Building (the

Radiochemical Processing Laboratory). Life extension for the other retained 300 Area facilities will be accomplished through $8 million total of General Plant Project (GPP), Institutional General Plant Project (IGPP), and overhead investments. Investment from other sources includes $5 million from the State of Washington for utility systems infrastructure for the Horn Rapids Triangle, $12 million from DOE-EM to support utility system infrastructure for the 300 Area, and a $32 million investment from PNNL through IGPP and laboratory overhead for transition, relocation, and infrastructure. Critical Decision-3a, Approve Start of Construction, is expected in July 2007.

The proposed **Physical Sciences Facility (PSF)** is shown in Figure C.2. This 201,000-square-foot building will house radiological, materials science, and ultra trace detection capabilities. As the primary replacement facility for the 300 Area, PNNL expects to break ground on the PSF in the fourth quarter of FY 2007.

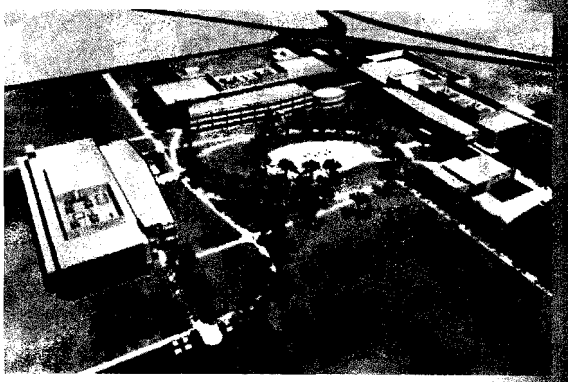


Figure C.2. Physical Sciences Facility

The two third-party facilities, the **Biological Sciences Facility (BSF)** and the **Computational Sciences Facility (CSF)** are shown in Figure C.3. These two facilities will be connected by a common entrance.

The BSF will be about 74,000-square-foot, privately funded facility, constructed on Battelle land near the center of the PNNL campus. The facility will house biological and nuclear magnetic resonance laboratory space.

The CSF will also be about 74,000-square-foot, privately funded facility built on Battelle land that will host information analytics capabilities, computer laboratories, and electronic and instrumentation laboratories.

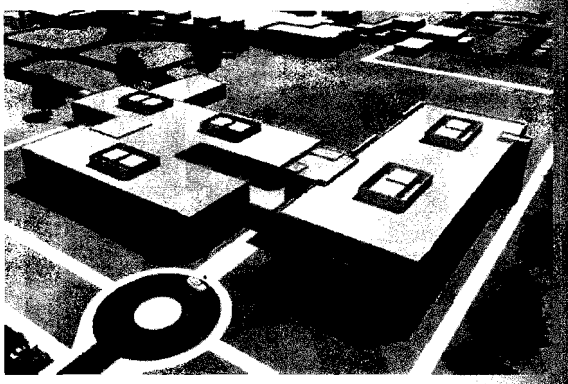


Figure C.3. Biological Sciences and Computational Sciences Facilities

The CRL actions will allow the PNNL to exit over 370,000 gross square feet (gsf) of aging infrastructure on the Hanford Site. Nearly 150,000 gsf of this has been exited to date, with the remainder (the non-retained facilities) to be exited by FY 2011. PNNL also intends to exit up to 60,000 gsf of non-core leased facilities to better co-locate PNNL research capabilities on the PNNL campus and approximately 20,000 gsf of Battelle private facility space to streamline management of Battelle facilities. Planned life extension for the retained facilities is 20 years, and options for replacing these facilities will be required in the future.

Facilities and Infrastructure – Actions Today to FY 2012 – Other actions are under way to address mission requirements for capabilities outside of the 300 Area. One is the Bioproducts, Sciences, and Engineering Laboratory (BSEL). This 57,000-square-foot, $24-million, facility (Figure C.4) is a joint effort between Washington State University (WSU) and PNNL, and will house PNNL research capabilities that principally support DOE-EERE Biomass programs including chemical and biological conversion capabilities. BSEL is located on the WSU Tri-Cities campus and will be jointly occupied by PNNL and WSU researchers. Construction is under way and occupancy is expected by the fall of 2007.

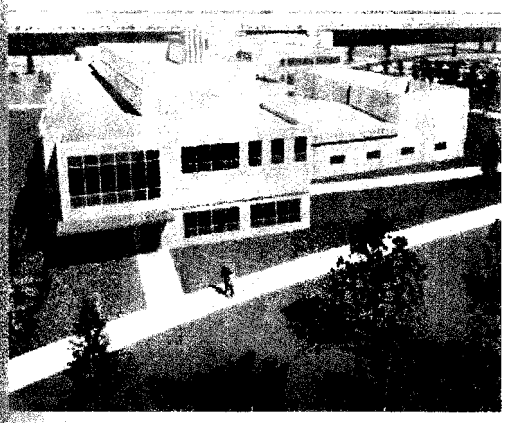


Figure C.4. Bioproducts, Sciences, and Engineering Sciences Laboratory

PNNL is also proceeding with two small GPP-funded facilities to address near-term space requirements, a 15,000-gsf office addition on the EMSL facility, and a new 10,000-gsf General Purpose Research Facility. Both of these spaces are needed to address overcrowding of staff and equipment in the EMSL facility and to provide general-purpose research space for PNNL staff.

Programmatically funded facilities and infrastructure is also planned for the next 5 years. Following a recommendation from a recent Biological and Environmental Research Advisory Committee (BERAC) review, the EMSL user program is planning a Radiological Annex facility. This facility will serve to expand the capabilities of EMSL to include radiological science and technologies for this national scientific user facility. In addition, the EMSL user program is planning expansions to its computational and mechanical system infrastructure to house the next generation of user research computer systems and instruments. These small expansions are planned for completion by FY 2012.

Facilities and Infrastructure – Actions FY 2012 to FY 2018 – PNNL has proposed two additional line items post-PSF, a programmatically funded North Laboratory expansion to EMSL and a System Development Laboratory (SDL) to be funded out of the Science Laboratory Infrastructure Initiative.

EMSL is undergoing recapitalization to ensure that it continues to meet its mission to provide integrated experimental and computational resources for discovery and technological innovation in the environmental molecular sciences area. In the future, as part of this effort, PNNL anticipates that additional facility infrastructure will be necessary to provide advanced shielding, vibration and temperature controls to support the next generation of highly sensitive instrument systems. The proposed EMSL North Lab would include construction of two laboratory modules on the north end of the building with an accompanying office pod extending east. This 55,000-gsf addition is proposed to be complete in FY 2014.

The SDL is proposed as a 150,000-gsf facility to be completed in FY 2015. It replaces aging leased facilities that are inadequate for future research programs and are distant from the main campus. Two leased facilities, 2400 Stevens and the Applied Process Engineering Laboratory (APEL), currently house laboratory space that supports PNNL capabilities in sensing and measurement technology and chemistry and process science. These facilities support multiple program elements including Energy Security (e.g., Solid Oxide Fuel Cells, Power grid technology), National and Homeland Security (e.g., remote sensing), and Science Innovation (e.g., the Atmospheric Radiation Measurement Program).
2400 Stevens is a 95,351-gsf facility, originally a warehouse that was converted to contain primarily dry laboratory space and offices. The facility is several miles from the main campus, and, given its construction, is anticipated to be in the last third of its useful life. Lately, changing research needs have required PNNL to modify this facility several times, including converting offices to labs and upgrading dry labs to wet labs and clean rooms. The APEL facility was designed as entrepreneurial space for start-up companies, and it was intended that PNNL occupy no more that 50% of the space. PNNL currently occupies over 57,000 gsf, or about three-quarters of the total facility. Long-term planning requires that we reduce our footprint; however, systems development space, especially with robust environmental controls and ventilation systems, is currently in short supply. New facility space would provide more robust systems to address needed requirements including the need for environmental controls, ventilation systems, clean rooms, and electronics lab space. If this space must be replaced via a new leased facility, then estimated annual lease costs would be $7 million to $9 million per year.

PNNL laboratory space is currently in short supply, with potential shortfalls in select laboratory types anticipated for FY 2012 and an overall shortfall by FY 2018.

Post-CRL project, PNNL is also planning to increase its investing in general-purpose facilities and infrastructure (via Institutional General Plant Project – IGPP – for capital and overheads for expense). Plans are to provide general-purpose research facilities and infrastructure such as small-scale laboratory and machine-shop expansions for general research support, as well as laboratory space rehabilitation. General support infrastructure is planned to include an Information Technology (IT) server housing facility and a shipping-and-receiving facility. In addition, upgraded and expanded utility systems and infrastructure will be addressed.

Table C.4 shows the projected demand for laboratory facilities compared to the current planned facilities. Demand for laboratory space is based on anticipated staffing levels, and space needs are based on distribution of staff by core competency. The projected demand also takes into account an anticipated improvement in the use of existing laboratory space. PNNL laboratory space is currently in short supply, with potential shortfalls in select laboratory types anticipated for FY 2012 and an overall shortfall by FY 2018. This short supply has the potential to impact PNNL's ability to attract and retain the best scientists and engineers, and creates inefficiencies in terms of co-location of capabilities and multiple moves to address programmatic requirements. PNNL anticipates the need for

50,000 to 90,000 gsf of new laboratory facility space in the FY 2012 to FY 2018 time frame to provide sufficient capacity. PNNL is exploring options to address this expected shortfall, including other program-funded facilities, state-funded facilities, or private investment.

Table C.4. Projected Demand for PNNL Laboratory Facilities

	Current	FY 2007–FY 2012[a]	FY 2012–FY 2018[a]
Total laboratory facility space assuming planned projects per Table C.3 – gsf	1,146,730	1,373,596	1,470,245
Projected Asset Utilization Index (AUI)	97%	99%	>100%
Asset Utilization Index – planning basis		95%	95%
Projected Laboratory facility space need @95% AUI – gsf		1,424,838[a]	1,561,680[a]
Estimated Excess (Shortage) – gsf		(51,242)	(91,435)

(a) Projected need based on FY 2012 and FY 2018, respectively.
FY = Fiscal year.

Figure C.5 shows the expected evolution of PNNL's facility portfolio in terms of ownership over the planning period, with a comparison to the pre-CRL baseline. Federally owned PNNL site facilities include EMSL, EMSL expansions, and new line item construction. Battelle- and core-leased facilities include Battelle private facilities, leased facilities on Battelle land, and state-funded facilities including BSEL. Lease and other non-core facilities are shorter-term arrangements outside of the core campus.

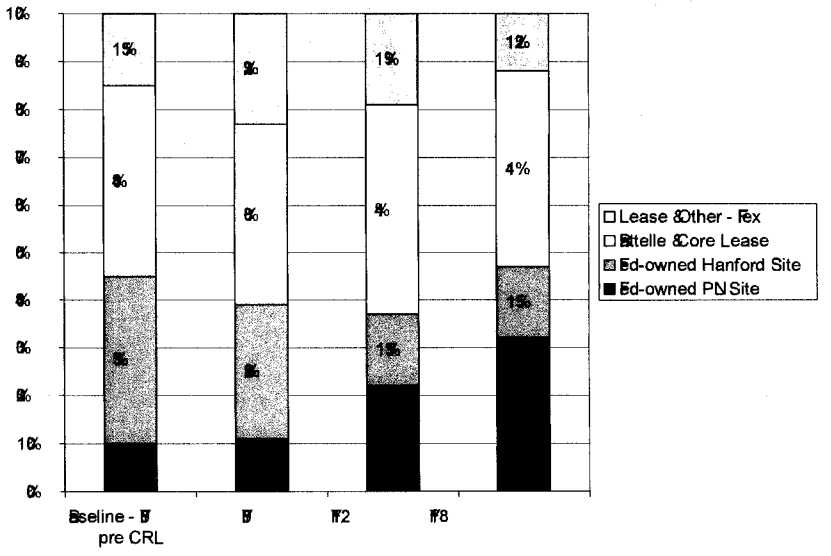


Figure C.5. Expected Evolution of PNNL's Facility Portfolio

In the next 5 years, the CRL project will significantly decrease Hanford Site legacy facilities; however, the balance between federal space and private space will likely not be restored to pre-CRL levels until the 10-year planning time horizon.

Figure C.6 shows the presently planned locations of major new facilities on the overall PNNL campus, along with existing facilities. This figure and other building-specific figures are architectural renderings of these facility concepts. Siting and space-banking implications of these various actions are described in subsequent sections, but are not anticipated to be an issue.

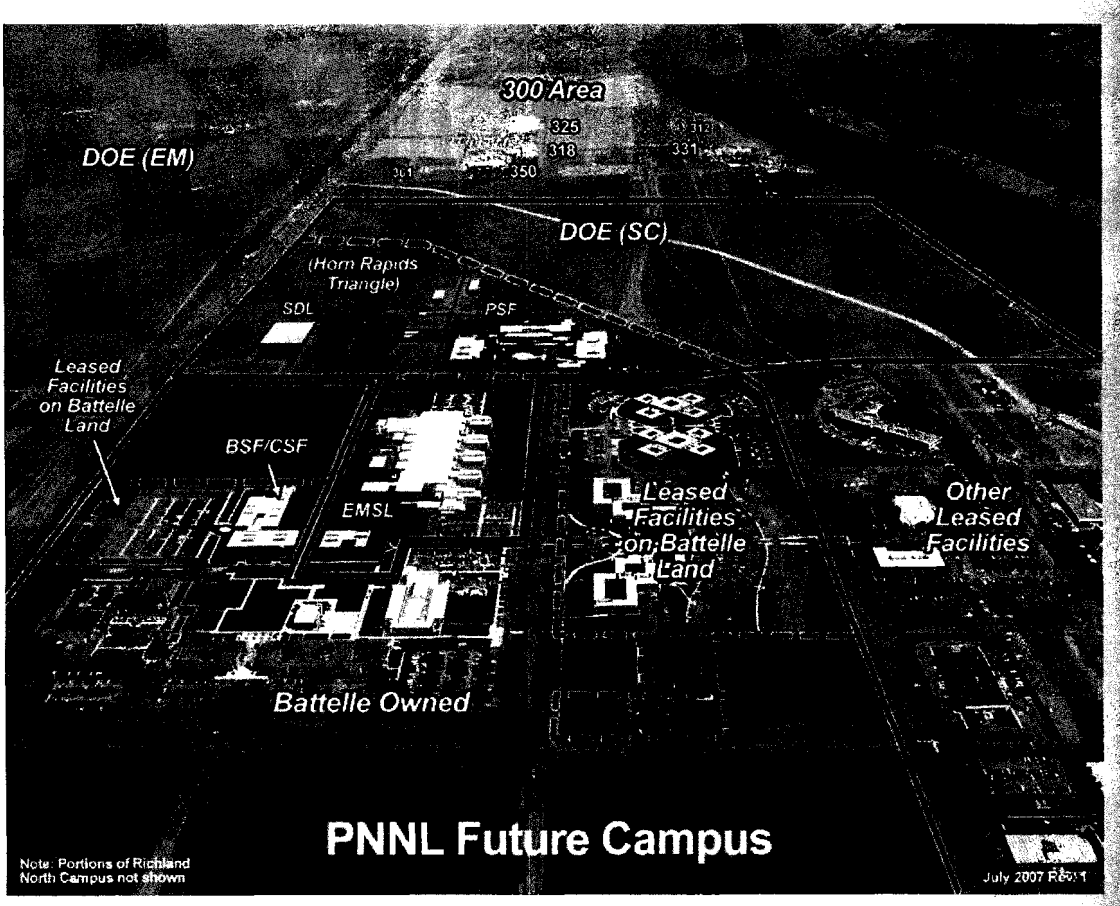


Figure C.6. Presently Planned Location of Select New Facilities (note: the BSEL facility—not pictured—is located at the south end of PNNL campus at WSU Tri-Cities)

D Facilities and Infrastructure (F&I)

D1. Vision, Goals, and Strategy for Facilities and Infrastructure

Vision

In line with DOE's Real Property Asset Management Plan, PNNL's strategy is to ensure alignment of its facilities and infrastructure with capability and mission requirements, improve the quality of its real property, and effectively manage its portfolio of assets. This translates to PNNL's overall vision for a modern research campus. Our vision is to create a campus that:

- Is flexible, right-sized, and can easily be reconfigured to respond to changing programmatic requirements.
- Is synergistic and collaborative where research capabilities are co-located for research synergy and where facility and infrastructure assets are designed to attract and retain a 21st century workforce.
- Can be operated and maintained cost effectively while assuring that the campus is safe, secure, and productive.

Goals

To achieve this vision, PNNL has established four strategic facility and infrastructure goals for the 10-year planning period:

PNNL's strategy is to ensure mission alignment of its facilities and infrastructure.

- Effectively transition mission-essential capabilities impacted by Hanford cleanup of the 300 Area into new or existing facilities, allowing disposition of Hanford Site legacy facilities.
- Provide non-300 Area research laboratory space sufficient to meet current and future programmatic mission requirements, while improving the alignment of existing facilities to research capabilities and missions.
- Operate, maintain, and expand the William R. Wiley Environmental Molecular Sciences Laboratory (EMSL) to meet user community needs now and in the future.
- Manage real property assets to achieve DOE's strategic goals for utilization, condition, and energy performance; and, through enhanced cost performance, allow reinvestment in PNNL's facilities and infrastructure.

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...sure operational ...veness and ...cy, PNNL ...es key ...mance metrics ...rgets and ...es actions to ... performance.

Strategy

At the highest level, PNNL's strategy focuses on enabling world-class research and development (R&D) and operating efficiently and effectively.

To enable world-class R&D, PNNL employs a Laboratory-level strategic planning process that focuses on every element of research and operations, including programmatic and staff forecasts for anticipated research programs. The mission requirements derived from this process become the basis for capability and facilities strategic planning. PNNL evaluates its portfolio of facilities and infrastructure against these requirements and identifies gaps where existing facilities and infrastructure are insufficient to meet program needs. PNNL then develops a strategy to address these gaps including improving utilization, acquiring additional assets, and eliminating facilities excess to need.

To ensure operational effectiveness and efficiency, PNNL compares key performance metrics with targets and identifies actions to improve performance. PNNL employs robust maintenance and energy-management programs (described in Sections D7 and D12, respectively) and develops and assesses new methods to improve performance. This includes a new method to measure the business performance of laboratory space as an indicator of utilization (described in Section D4). Other performance indicators and measures are described in Section D11.

DOE-SC Objectives: PNNL's goals and strategy align with overall DOE Office of Science (DOE-SC) objectives as described below.

- **Right-Sized Facilities** – Over the 10-year planning horizon, PNNL is undertaking several actions to ensure that facilities are sized appropriately for its research activities now and in the future. PNNL will exit approximately 370,000 gross square feet (gsf) of Hanford Site legacy facilities in the 300 Area and transition into modernized new or existing facilities that are designed and sized to meet current and future mission needs. Approximately 150,000 gsf has been exited to date, and the remainder will be exited by February 2011.

  In addition, PNNL has undertaken several actions to improve laboratory space utilization. Currently, PNNL laboratory space utilization is well above the desired target (see Section D4) to the point of overcrowding in select areas. PNNL is taking near-term actions to address this overcrowding, including rehabilitating existing laboratory space and constructing small, general-purpose research facilities. Longer term, PNNL is planning actions to co-locate capabilities and exit off-site lease space by constructing a Systems Development Laboratory (SDL) and investing in several small-scale modernization actions. EMSL infrastructure must also be sized appropriate to user needs and programmatic expansions are planned. In the

5- to 10-year time horizon, providing sufficient laboratory space to meet mission requirements will present the most significant challenge for PNNL.

- **Quality of Facilities** – High-quality facilities help PNNL attract and retain high-quality staff. The facilities being constructed as part of the 300 Area Capability Replacement Laboratory (CRL) Project are designed with modern requirements in mind, and PNNL is planning to make investments in life extension for the retained facilities such that they will continue to meet research requirements for the next 20 years. EMSL will be sustained such that it remains in "excellent" condition (Asset Condition Index [ACI] > 0.98) and PNNL will continue to invest via the Institutional General Plant Project (IGPP) in maintaining and upgrading its facilities to ensure mission readiness. For all facilities, an annual customer satisfaction survey queries all employees to ascertain their perception of facility quality (indicators such as office lighting; heating, ventilation, and air conditioning [HVAC] performance and proximity of parking are rated on a scale of 1 to 5) and their importance ranking of the indicators (the importance to doing their work is ranked on a scale of 1 to 3). PNNL facilities are consistently ranked highly satisfactory (currently 3.9) by their occupants. The importance ranking is used to prioritize maintenance and improvements. Other indicators of facility quality are described in Section D12.

- **Safe, Healthy, and Secure Facilities** – As part of capability transition from the 300 Area, activities are under way to ensure that ongoing R&D operations in the 300 Area are not disrupted by D4 activities and that PNNL staff working in the 300 Area are not subjected to adverse health and safety conditions as a result of these activities. In addition, the Transition Project is working to ensure that PNNL achieves an adequate state of readiness for each of the new CRL facilities that are being brought on-line. This includes any required modifications or enhancements to PNNL's operating model and management systems. Plans for campus security are addressed through PNNL's campus master planning activities. Current plans include maintaining medium-level security requirements by controlling access at the perimeter of the campus while at the same time creating the feel of an open environment. The perimeter will have the look and feel of a soft barrier that blends into the landscape and does not have the image of a fortress but will stop the proper vehicles. Parking will be located outside the perimeter. Implementation will likely be in a phased approach where initially specific stand-off distances for buildings will be implemented to meet the required level of security. In addition, a Campus Public Safety Camera System has been installed that includes free-standing emergency call stations to allow staff to immediately seek assistance or report events should the need arise.

- **Communication and Information Infrastructure** – High-performance Internet access with sufficient capacity, connectivity, reliability, and breadth of service is critical to PNNL's research activities. Bioinformatics, climate

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sciences research, and other signature capabilities of the Laboratory require capacity to handle large data transfers between distributed data archives and computational resources. The Laboratory is currently connected to other DOE laboratories and research centers through the Energy Science Network (ESnet) with a 10-gigabit per second connection; however, high-speed connection to other research and engineering (R&E) networks will become increasingly important. Many of these connections are provided through ESnet peering services. However, the Laboratory must continue to develop the capability to provide its own direct connection to strategic research networks by leveraging PNNL's own Regional Optical Network and collaborative regional network initiatives like the Northwest TeraLink. PNNL expects to leverage its investment in the fiber optic network into a regional network that connects research institutions, universities, and science and technology parks in Washington, Oregon, Idaho, and Montana.

While openness and collaboration with outside partners marks one end of the scale of PNNL's research, national security and homeland defense requirements dictate a more secure environment. The Cyber Security Program is constantly challenged to combat ever-increasing and sophisticated cyber threats with minimal impact on authorized use of the Laboratory's information resources. In the past several years, cyber security improvement investments have been made to partition the PNNL network into "enclaves" that 1) contain systems and information of comparable sensitivity with security controls appropriate to the threats and potential loss; 2) implement network and host-based Intrusion Detection Systems (IDS) to detect and protect against attacks; and 3) implement the Network Address Registration System (NARS) to register and track all devices connected to the PNNL network, allowing for quick association between a detected security fault and the location and owner of the affected system.

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Moving forward, emphasis will be placed on incorporating sound cyber security practices into all information technology (IT) operations and support processes and activities. We will leverage PNNL's research and development in the field of cyber security and collaborate with other government agencies, universities, and industry. We will continue to employ a graded risk-management approach that balances risk with business needs and available funding. We will refine our enclave structure so that it is more responsive, bolster our intrusion detection systems, and expand our network access registration system to include system health checks as a system connects to our network. We will also be increasing our emphasis on the protection of personally identifiable information (PII) used by our mobile workforce and educating staff on protecting against social engineering.

- **Efficient Operation and Maintenance** – Over the past 5 years, PNNL has achieved a 20% reduction in its buildings and utilities costs on a per research full-time equivalent (FTE) basis. Factors that have contributed to

this include reduced energy consumption, reduced operating costs, and improved space utilization. Going forward, PNNL is planning several actions to continue to enhance its management performance. This includes implementing new operating models as part of 300 Area transition activities, improving leasing strategies to reduce costs, and improving energy efficiency. PNNL also intends to optimize its use of leased space to both meet mission requirements and manage costs. The SDL is a key part of that strategy. PNNL is continuing to look at ways to improve energy performance and will be responsive to Executive Order 13423 and DOE's Draft Transformational Energy Action Management (TEAM) Goals. These and other actions are expected to provide cost savings to allow reinvestment in laboratory infrastructure to match DOE-SC strategy. Further information on these actions is provided in Sections D4, D9, D12, D13, and D14.

Roadmap: The roadmap of planned activities and resource needs to accomplish these objectives is presented throughout this Ten Year Site Plan (TYSP). In particular, Section C (Current and Future Mission for the Site) discusses mission requirements and planned new facilities and infrastructure. Sections D9 (Recapitalization and Modernization) and D13 (Leasing and Third-Party/Non-Federal Funded Construction of New Buildings) describe specific acquisition activities with the funding resources for these planned activities detailed in Attachment 4. PNNL is also investing laboratory overhead in maintenance and operations to meet sustainment and energy efficiency goals.

The CRL proje... the number-one... priority of the... Laboratory.

Role of Leasing and Privately Financed Facilities: PNNL's strategy is to optimize the use of leased space to meet mission requirements, provide adequate facility quality, and control costs. PNNL's primary responsibility is to provide its research capabilities to meet mission requirements, and to do so it must have facilities of adequate quality and capacity. Leased space can be used effectively to address these requirements, especially if the need is near term, the space requirements are more generic in nature (such as office or light/general-purpose laboratory), and if a commercial market for the space exists. As part of the CRL project, two facilities, the Computational Sciences Facility (CSF) and the Biological Sciences Facility (BSF), are proposed as being the most suitable for private investment of the portfolio of facilities needed to enable the accelerated cleanup of 300 Area facilities. The business case provided for these facilities indicates that the transaction conforms to DOE and the Office of Management and Budget's (OMB) orders and guidelines. PNNL is currently awaiting DOE and OMB approval for these facilities. Over the long term, PNNL's strategy is to become less reliant on leased space, especially aging facilities distant from the main campus. The SDL is a key part of the strategy.

Key Facilities and Infrastructure Issues

For the FY 2007 TYSP, PNNL's most critical issue is delivering the CRL project including the Physical Sciences Facility (PSF) line item activities, life extension

for the retained facilities, and construction of the BSF and the CSF. The CRL project is the number-one priority of the Laboratory.

Cross-Program Issues: Two cross-program issues dominate all others:

- **DOE-SC and DOE-EM**: The DOE-EM decision to accelerate cleanup of the Hanford 300 Area forces the relocation of PNNL researchers and replacement of facilities by 2011. The DOE-SC CRL project, which will provide the new facilities, has a significant impact on the DOE-EM cleanup schedule and cost. Evolving this year from the CRL project, a number of facility complexes that are currently DOE-EM-owned and located within the Hanford Site 300 Area are planned for life extension of 20 years. Actions to clearly define, articulate, and implement DOE-EM and DOE-SC roles and responsibilities around 300 Area operations are under way. DOE-EM and DOE-SC have approved a May 2007 Memorandum of Agreement that will serve as the basis to implement action plans that simultaneously assure minimal impact to:
  - Completing the DOE-EM River Corridor Cleanup Project
  - Completing the PNNL CRL project
  - Ongoing PNNL research activities in the 300 Area

  The local DOE offices, Richland Operations Office (DOE-RL) and Pacific Northwest Site Office (PNSO), are in the process of establishing the implementation plans for this Memorandum of Agreement.

- **DOE-SC, NNSA, and DHS**: The CRL Line Item project (the Physical Sciences Facility project) is being funded from three sources. While subsequent Critical Decisions have been delegated to the Under Secretary, continued attention to this coordinated funding approach is required over the life of the this project.

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D2. Process for Identifying F&I Needs and Development of Plans to Meet the Vision, Goals, and Strategy

PNNL identifies F&I needs and meets the F&I visions, goals, and strategy through three primary activities: strategic planning, annual planning, and the facility management system.

PNNL identifies F&I needs and meets F&I visions, goals, and strategy through strategic planning, annual planning, and the facility management system.

The *Laboratory Strategic Planning* function enables the identification, communication, and maintenance of Laboratory-level goals and objectives and the multi-year plan by which they will be achieved. The Laboratory's goals and objectives are articulated in the form of a Laboratory Strategy that guides investments in capability and business development, provides a framework for operational investments, and serves as an anchor to which resources and activities throughout the organization are aligned. PNNL has the processes, tools, and analysis that 1) enable development and documentation of the Laboratory mission, vision, strategic goals, and strategy and 2) facilitate the development, implementation, and management of PNNL's major science and technology activities and investment initiatives.

The Laboratory Strategy is established by the Laboratory Director in response to DOE requirements for mission accomplishment and program development, Laboratory stewardship and operational excellence, and Battelle strategic priorities and risk thresholds. The Laboratory Director, through the Laboratory Executive Council, defines performance objectives, measures, targets, and deliverables to be achieved as part of strategy execution. Performance against the strategy is monitored and reviewed throughout the year, and the overall Laboratory Strategy is refreshed as needed (typically on an annual basis).

The *Annual (Business) Planning* function is the Laboratory's principal means of flowing strategy, requirements, and performance expectations into the organization and aligning resources to achieve them. Business planning brings strategy into the realm of execution by identifying the actions to be taken and the outcomes to be delivered during a fiscal year (planning period) that will move the Laboratory forward, and aligns and allocates the resources to do so. The outcomes of business planning become the basis for assessment of performance against Laboratory Strategy, Laboratory-level investments, business plans, contractual performance (e.g., the Performance Evaluation and Measurement Plan), assurance, and financial performance. The business planning process is shown in Figure D2.1.

The *Facility Management System* provides the overall framework that supports the work of the Laboratory by planning and forecasting facility needs; acquiring and constructing new facilities to meet emerging needs; operating, maintaining, and renewing the facility portfolio; disposing of facility and land assets that are excess to need; and providing a set of core and purchased staff and guest

services. The actions and directions of the Facility Management System are the result of the annual planning process that defines the basic facilities objectives for PNNL.

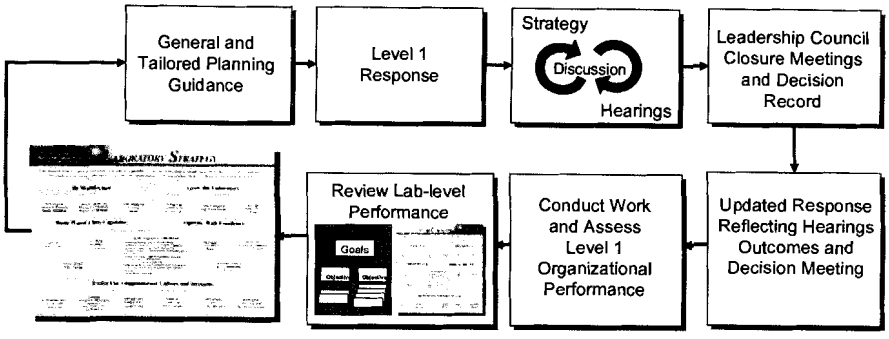

Figure D2.1. Illustration of PNNL's Annual Planning Process

The Facility Management System comprises five major functions:

- Facility planning, forecasting, and acquisition
- Facility engineering and construction project management
- Building operations
- Facility maintenance and renewal
- Facility disposition.

The interrelationship among these five major functions is illustrated in Figure D2.2, and the processes within these functions are summarized below.

The *Facility Planning, Forecasting, and Acquisition* function translates business needs and facility condition information into a comprehensive facility strategic plan and facility utilization standards. The plan and standards are then used to decide which future facility and land investments are most important to the successful execution of the Laboratory's mission, the Laboratory agenda, and long-term business strategy. Planning and forecasting processes employ economic analyses that may involve the use of macro-level space need projections, tradeoff studies, alternative-funding analysis, investment templates, or life-cycle cost estimates. Facility acquisition processes evaluate, select, and initiate options for acquiring facility or land assets when needs have been validated by planning and forecasting processes. Acquisition may involve a new lease or rental, new construction, new ownership, or other arrangements; provides the funding process management stewardship that results in the procurement of capital real property assets and general plant equipment; and manages out-leasing of building space.

The *Facility Engineering and Construction Project Management* function develops and implements project conceptual designs, siting evaluation factors, and site selection criteria for new capital line item construction projects. Outputs

of this function will include construction project baselines (scope, schedule, and cost), value engineering reviews, and the construction of new or significantly modified buildings, including providing for beneficial occupancy.

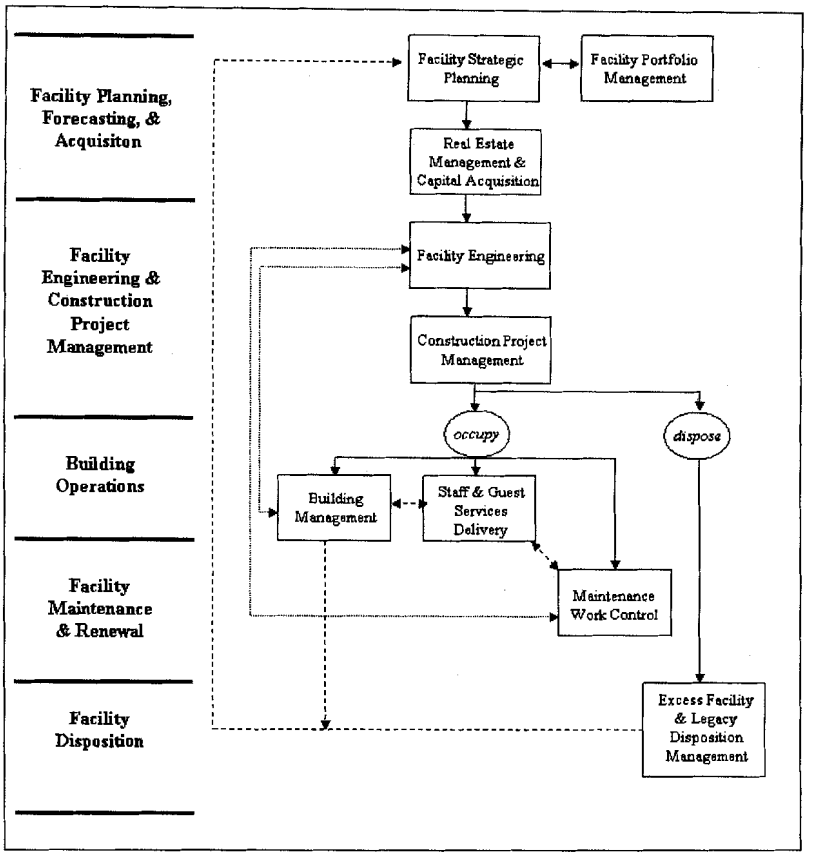

Figure D2.2. PNNL's Facility Management Function-Process Relationship Flowchart

The Building Operations fun provides safe, effective, and e operation of fa and land assets through buildin management processes

Facility Engineering and Construction processes interface with building operations processes through the preparation, maintenance, and control of facility design configuration baseline documents for newly constructed buildings or buildings that have undergone major modifications. Facility engineering processes also support ongoing facility configuration management and provide engineering and design associated with building systems, structures, and components.

The *Building Operations* function provides safe, effective, and efficient operation of facility and land assets through building management processes, which provide facility core teams that deploy work processes to manage the building operational boundary through implementation and stewardship of Facility Use Agreements (FUA) and Safety Basis Documents, provide emergency management functions (Emergency Preparedness Program implementation, Off Normal Event Reporting coordination), and operate building utility systems including management of energy use and conservation practices.

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Staff and guest services delivery processes within this function provide core and purchased services such as mail, convenience copiers, duplicating/printing services, conference room scheduling, cafeteria and vending machine services, PNNL switchboard operations, and the Guest House at PNNL.

The *Facility Maintenance and Renewal* function provides the resources and equipment necessary to repair, maintain, and renew the systems, structures, and components associated with the Laboratory's facility and land assets. The facility maintenance work control process provides predictive, preventive, and planned maintenance on building systems, structures, and components; custodial and floor maintenance; and roads and grounds maintenance (including parking lots). Corrective maintenance processes provide repair of building systems, structures, and components, as well as minor alterations and modifications of building space.

The *Facility Disposition* function transitions Laboratory facilities that are deemed excess to need, require excessive capital investment for effective operation, or can no longer be occupied due to site cleanup schedules, from active status to unoccupied-standby mode prior to final disposition and provides continuous management of building legacies and associated ground contamination until reassignment or remediation. Processes involve interim surveillance and maintenance, stabilization, deactivation, decontamination, decommissioning, demolition, and/or transfer of the facility out of PNNL control.

In summary, the overall approach at PNNL is to perform Laboratory-level strategic planning to define future programmatic directions of the organization, to develop detailed forecasts of programmatic demand for staff, and translate these forecasts directly into facilities demand forecasts. The facilities demand forecast articulates the amount and type of space needed at PNNL over the 5-year planning period. The Director of Facilities and Operations (F&O) stewards the Facilities Management systems with documented and specific roles and responsibilities that perform the life-cycle planning, condition assessments, construction, space utilization, and management of excess space. All of these activities culminate during PNNL's preparation of the TYSP, which documents the current and comprehensive plan for PNNL facilities and infrastructure.

D3. Land Use Plans

As described in DOE Order 430.1, *Real Property Asset Management*, site planning for real property assets must be consistent with DOE P 430.1b, *Land and Facility Use Planning* and must be based on accepted planning principles and industry-wide practices. The planning process must include all forms of activity that may affect real property including acquisition, development, utilization, maintenance, recapitalization, and disposition. Real property plans also must be consistent with the yearly Integrated Facilities and Infrastructure (IFI) Crosscut Budget in support of program missions and growth.

In total, DOE operates the Hanford Site, a 580-square-mile site north of Richland, Washington. The Pacific Northwest Site Office (PNSO) has responsibility for PNNL as well as the PNNL campus.

The Pacific Northwest Site has responsibility PNNL as well

The PNNL campus consists of buildings on the Hanford Site (principally in Hanford's 300 Area), buildings on the DOE designated PNNL Site, buildings owned by Battelle on Battelle land, leased buildings on Battelle land, other leased buildings on third-party owned land, and multiple offsite locations.

The Hanford Site consists principally of multiple facilities in the 300 Area north of the City of Richland. These facilities will be reduced as a part of the CRL project to four main retained facilities along with supporting buildings. The 300 Area currently resides on DOE-EM land. In addition, there are a few facilities on the Hanford Site to the north of the 300 Area that PNNL operates in support of DOE-EM work.

The PNNL Site includes 30 acres occupied by EMSL south of Horn Rapids Road, 100 acres of vacant property north of Horn Rapids Road between Stevens Drive and George Washington Way, known as the Horn Rapids Triangle, and 220 acres between the north edge of the Horn Rapids Triangle and the south end at the 300 Area. Land south of Horn Rapids Road and the Horn Rapids Triangle (130 acres) is in the City of Richland. The Horn Rapids Triangle will be the home of the new Physical Sciences Facility. The 220 acres was recently transferred from DOE-EM to DOE-SC.

Battelle owns 250 acres south of Horn Rapids Road within the City of Richland. Facilities on this land are both Battelle-owned and third-party leased facilities, and represent the campus core sector facilities as noted in the *Campus Master Plan*. The balance of the PNNL campus is on third-party-owned land stretching from south of Horn Rapids Road to various facilities to the farthest south part of the campus – 2400 Stevens building and soon to be operating Bioproducts, Sciences, and Engineering Laboratory (BSEL) facility.

Even with these multiple locations, PNNL has established and continues to enhance the integration of the utility systems and infrastructure across the entire PNNL campus, addressing the ownership, provider, operator, and investment

plans of each. PNNL's overall goal is to fully integrate the utility systems and infrastructure with, to the greatest extent possible, single owners and single providers/operators for each system – providing long-term, highly reliable and effective (and low) life-cycle cost services.

The PNNL campus primary utility systems and infrastructure of electrical, water and sewer, IT (phone/LAN), and natural gas systems are currently in various stages of enhancement. Expectation is that within 5 years they will be in a condition that will support both the current and next 5 to 10 years growth requirements. Specifically, the City of Richland's Horn Rapids Triangle utility project that addresses most of the required utility systems and infrastructure will be completed this fiscal year and will include electrical, water and sewer, and communications. The City of Richland utility systems and infrastructure on the balance of the PNNL campus are to be upgraded over the next couple of fiscal years. Finally, the 300 Area utility project is planned to be completed by the River Corridor Cleanup Contractor (RCCC) by FY 2012 or sooner.

In addition, PNNL includes numerous offsite locations with the Marine Research Operations in Sequim, Washington, being the most significant. Others include offices at Washington, D.C.; Seattle, Washington; and Portland, Oregon.

NNL Campus Plan provides lysis of the PNNL and endations to modate ated program over the next rs and beyond.

Consistent with DOE P 430.1b guidance, PNNL, in conjunction with a third-party architect-engineer firm, developed the PNNL *Campus Master Plan* Update, July 2005. PNNL is in the process of updating this master plan as a result of the recent CRL project approvals and plans. This master plan provides an analysis of the existing PNNL campus and recommendations to accommodate anticipated program growth over the next 20 years and beyond. It further recognizes an existing land use pattern and proposes to strengthen it in the development of the campus to strategically locate programmatic components of the growth.

Sections of this master plan document represent the pertinent information that forms the basis of PNNL's Land Use Plan. As noted, PNNL's *Campus Master Plan* is being updated and it is expected to be completed by the end of the fiscal year. Upon completion, PNNL's Land Use Plan will be revised accordingly.

D4. Utilization and Excess Real Property

PNNL's current portfolio of federally owned facilities consists of facilities on the Hanford Site and the EMSL. The Hanford Site 300 Area facilities operated by PNNL were transferred to DOE-EM in December 2003 in anticipation of PNNL being required to completely exit these facilities. In December 2006, the CD-1R approved by Deputy Secretary Clay Sell for the CRL project included retaining and upgrading four of these facilities (318, 325, 331, 350) to extend their life for 20 years. The remaining facilities are to be transitioned to the RCCC on the schedule given in Table D4.1, which is consistent with the May 24, 2007, Memorandum of Agreement, between DOE-SC and DOE-EM.

In December 2[illegible] the CD-1 Revis[illegible] approved by Dep[illegible] Secretary Clay [illegible] for the CRL pro[illegible] included retain[illegible] and upgrading [illegible] these facilities ([illegible] 325, 331, 350[illegible] extend their life[illegible] 20 years.

Table D4.1. PNNL 300 Area Facilities Being Exited

Facility	Facility Vacant	Turnover Milestone
323	July 31, 2007	September 30, 2007
326	June 29, 2009	September 30, 2009
331C, D, G, H, P	August 1, 2009	September 30, 2009
336	August 31, 2008	September 30, 2008
338	July 23, 2008	September 30, 2008
3718P	August 31, 2007	September 30, 2007
3730	July 31, 2007	September 30, 2007
3760	August 25, 2009	September, 30 2009
320	January 31, 2011	February 28, 2011
329	January 31, 2011	February 28, 2011

To accomplish this transition, PNNL established the Transition Project with the objective to:

- Achieve successful relocation of 300 Area capabilities (staff, equipment, materials and supplies) from their existing locations to new or renovated facilities with minimal disruption to ongoing research activities and in a manner that supports facility turnover schedule given above.
- Meet the completion criteria for CRL Critical Decision 4c by making the surplus facilities available for turnover to EM in a safe, known, and stable condition consistent with DOE Orders, our "Approach to Transition" agreement and the above schedule.
- Assure ongoing R&D operations in the 300 Area with minimal disruption from ongoing D4 activities.
- Assure that PNNL staff working in the 300 Area are not subjected to adverse health and safety conditions as a result of D4 activities.

...y exit of ...ilding creates ...ant challenges ...entially puts ...$40 million ... of research ...ous clients.

- Assure that PNNL achieves an adequate state of readiness for BSEL, BSF, and CSF including any required modifications/enhancements to PNNL's operating model and management systems in order for the CRL Line Item Project to meet its facilities start-up schedule.

- Develop and implement the necessary agreements for delivery of utilities and services to PNNL's retained facilities in the 300 Area.

Activities are under way to meet these objectives and the schedule above. Several facilities are planned to be exited prior to replacement space being available, requiring double moves in many instances. In particular, an early exit of 326 Building creates significant challenges and potentially puts at risk $40 million per year of research for various clients. Recently, small 331 complex buildings (331C, G, H, P) were also included as part of transfer activities. Facility turnover dates have been established in the May 2007 Memorandum of Agreement between DOE-SC and DOE-EM. These dates will be evaluated upon the completion and submittal of RCCC's mitigation plan, which will determine what impact, if any, would result from a later turnover date of these facilities. PNNL is working closely with the RCCC to provide input on PNNL's risks and costs associated with these dates.

Based on the planned transfer to the RCCC of vacated facilities, PNNL manages only one DOE-EM-owned excess facility, the one-hundred-square-foot 614 Building, a former environmental monitoring station, and does not plan for any additional excess real property over the next 10 to 20 years. It is anticipated that the 614 Building will be transferred to the Plateau Closure Contractor during contract transition shortly after contract award.

The Asset Utilization Index (AUI) for DOE-SC-owned facilities is shown in Table D4.2 (EMSL only).

Table D4.2. Asset Utilization Index (AUI) for EMSL

Performance Measures	Operating Number Buildings	Actual FY 2006	Target FY 2006	Target FY 2007	Target FY 2008	Target Long Term	Achieve Target
Laboratory	1	100%	85.00%	86.00%	87.00%	90.00%	2012

FY = Fiscal year.

The AUI for DOE-EM-owned Hanford Site facilities is 94.43%. Implementation of the CRL project will allow PNNL to exit several less well used facilities, and after this project is complete, the AUI for retained facilities is anticipated to be greater than or equal to 98%.

PNNL is currently significantly exceeding targets for Laboratory AUI in federally owned facilities. An analysis of leased and Battelle-owned facilities indicates that the AUI for laboratory space throughout the PNNL campus is very

high (97%) with overcrowding occurring in select facilities. This overcrowding has the potential to impact PNNL's ability to attract and retain the best scientists and engineers, and creates inefficiencies by limiting our ability to co-locate capabilities and by requiring multiple moves to address programmatic needs.

Because of these challenges, PNNL has recently developed a new analytic basis for laboratory space management that explicitly treats lab space as a business resource; that is, the utilization of a space is measured in terms of the magnitude of research work performed, rather than the concept of space utilization in which the efficiency of space use is linked to levels of occupancy. This is providing opportunities to target particular areas for enhanced performance.

PNNL is curre... significantly ex... targets for Labo... Asset Utilizati... Index in federa... owned facilities.

D5. Long-Term Stewardship

PNNL will continue to transition out of facilities as required to depart the 300 Area by February 2011 in accordance with current planning commitments. Surveillance and Maintenance (S&M) activities will continue on vacant DOE-EM facilities as required until exit and reassignment of the facilities to the RCCC have been accomplished. The S&M activities for the shutdown facilities are designed to maintain a safe shutdown envelope for each facility. Upon exit of the north 300 Area, PNNL will no longer have any long-term stewardship responsibility for any 300 Area facilities. However, full operations will continue for the next 20 years in the retained facilities.

exit of the 300 Area, will no longer ny long-term dship bility for any rea facilities.

Until that time, the long-term stewardship activities include the inspection and monitoring of the facilities both on the interior and exterior on a quarterly or semiannual basis, depending on the type of facility and associated risks. The specific activities include essential maintenance, housekeeping, and grounds keeping. Present planning does not include major repairs such as roof replacement, deactivation, or demolition. Planned activities will allow PNNL to maintain the facilities and any excess property items contained in the buildings in a safe and environmentally compliant condition. The ultimate goal of this activity is to control, prevent, and mitigate dangers associated with the hazardous materials which are part of the "as left" structure. In addition, the activities will include reporting, recordkeeping, and any required documentation as well as integration with any other programs as required.

Current funding for these activities is provided by DOE's Richland Operations Office (DOE-RL) through the Facility Transitions Project, WBS 4.2.3.20, within Hanford Site Project Baseline Summary (PBS) RL-0040C and is budgeted through FY 2009. FY 2010 and FY 2011 will be funded by PNNL overhead accounts with no fund requirements in FY 2012 and FY 2013. Current baseline budgets for facility S&M through FY 2013 are shown in Table D5.1.

Table D5.1. Current Baseline Budgets for Facility Surveillance and Maintenance

WBS	Project	FY 2007 Budget (in $K)	FY 2008 Budget (in $K)	FY 2009 Budget (in $K)	FY 2010 Budget (in $K)	FY 2011 Budget (in $K)	FY 2012 Budget (in $K)	FY 2013 Budget (in $K)
4.2.3.20.2	S&M	$235	$30	$758	$188	$715	$0	$0

FY = Fiscal year.
S&M = Surveillance and Maintenance.

D6. Replacement Plant Value Estimates

PNNL is currently using the DOE FIMS models for replacement plant value (RPV) calculation for all DOE-SC-owned real property assets (e.g., EMSL) and has applied system-generated RPV updates. PNNL performs this annually based on DOE-SC direction. In FY 2006, PNNL began testing the RS Means CostWorks application (supplied by DOE) to allow for greater fine-tuning of the current FIMS models to more closely match the unique characteristics of DOE-SC real property assets in the PNNL portfolio and to adjust the underlying assemblies and systems that make up the models. This testing is intended to result in more accurate RPVs and facility condition indexes and will be deployed in the new DOE-SC facilities expected to come online over the next 10 years. Testing of the CostWorks application continues in FY 2007, including a comparative analysis of details associated with "mark-ups" (i.e., Site Factor) that are coming out of the PSF Line Item project.

PNNL performs replacement plant value estimates annually, based on DOE-SC direction.

The DOE-SC RPV total estimates for PNNL, consistent with the FY 2008 budget process and for estimating out-year RPV levels, are shown in Table D6.1.

Evolving this year from the CRL project, a number of facility complexes that are currently DOE-EM-owned and located within the Hanford Site 300 Area are planned for life extension of 20 years. Actions to clearly define and implement DOE-EM and DOE-SC roles and responsibilities around 300 Area operations are under way. At this time, the 300 Area facilities planned to be retained have a total RPV of $122 million, and facilities to be exited by FY 2011 have an RPV of $70 million.

Table D6.1. Estimated RPV for DOE-SC-Owned Buildings in PNNL Portfolio

	RPV of Existing Facilities at Beginning of FY (in $M)	Estimated Additions in FY (in $M)	Total Estimated RPV (in $M)	Escalation (2.3%) (in $M)
FY 2009	80	10	90	92
FY 2010	92	5	97	99
FY 2011	99	199	298	305
FY 2012	305	9	314	321
FY 2013	321	5	326	333
FY 2014	333	34	367	376
FY 2015	376	94	470	481
FY 2016	481	2	483	494
FY 2017	494	5	499	510
FY 2018	510	4	514	526

FY = Fiscal year.
RPV = Replacement plant value.

D7. Maintenance

PNNL is using the Maintenance and Repair System (MARS) application, by Whitestone Research, designed to optimize real property asset management over the entire expected life-cycle of its facilities. The application aligns with existing DOE facility stewardship requirements and establishes the basis for maintenance activities at PNNL aimed at attainment of the DOE-SC expectation that each site meet the minimum Maintenance Investment Index (MII) goal of 2% of RPV across the portfolio. The deployment of this application is intended to establish a basis for a decision resulting in a site maintenance funding level that would address all maintenance needs so that no maintenance is deferred annually.

conducts nance ies consistent the DOE goal ieving a nance ent across the io of 2% or of replacement value.

PNNL conducts maintenance activities consistent with the DOE goal of achieving a maintenance investment across the portfolio of 2% or more of RPV. Table D7.1 shows the site maintenance funding plan anticipated for all DOE-SC-owned real property assets. The increase in site maintenance funding over the next 10 years is the result of changes to RPV in the future (detailed in Section D6), which primarily result from newly constructed line item and General Plant Project (GPP)/IGPP projects that are DOE-SC owned. Given the mix of what will be relatively new DOE-SC-owned facilities, PNNL expects to achieve the goal of maintenance investment at 2% of RPV.

Evolving this year from the CRL project, a number of facilities that are currently DOE-EM-owned and located within the Hanford Site 300 Area are planned for life extension of 20 years. Maintenance expenditures for these buildings in the past several years, while maintaining minimum safe operational and mission ready conditions, have been consistent with the original 300 Area Accelerated Closure Plan, which established 2009 as the date by which PNNL was to have vacated all 300 Area DOE-EM-owned facilities it occupies. Under the plan to retain select facilities, actions to clearly define and implement DOE-EM and DOE-SC roles and responsibilities around 300 Area operations are under way and a maintenance strategy consistent with these roles will be adopted. PNNL's strategic intent is that these retained facilities will be maintained to meet mission requirements for the planned 20-year period.

L's strategic is that these ed 300 Area s will be ined to meet n requirements planned period.

The MARS application delivers the primary tool that helps to prioritize facility assets based on mission, business, and Environment, Safety, and Health (ES&H) impact. It also provides condition assessment and maintenance forecasting based on current, technically valid data. Traditionally, life-cycle management was an independent program focused solely on defining asset condition that allowed for planning major renewal activities in a 3- to 5-year period. PNNL has integrated the life-cycle management function into the building operations and maintenance processes, creating a more holistic program.

The estimated costs for the projects incorporated in the above table are included in the FY 2009 Integrated Facilities and Infrastructure (IFI) Crosscut included as Attachment 4, so they are not provided in detail here.

Table D7.1. PNNL Maintenance Funding Plan for DOE-SC Facilities

	RPV (in $M)	DOE-SC Goal (minimum 2% of RPV) (in $M)	Planned Site Direct Funded Maintenance in FY (in $M)	Planned Indirect Funded Maintenance in FY (in $M)	Total Planned Site Maintenance Funding (in $M)	MII Calculation	Explanation (if Funding Plan does not meet goal or results in deferred maintenance)
FY 2009	80	2	0	1	1	1.6%	(a)
FY 2010	92	2	0	2	2	2.4%	
FY 2011	99	2	0	4	4	3.8%	
FY 2012	305	6	0	5	5	1.7%	(b)
FY 2013	321	6	0	5	5	1.6%	(b)
FY 2014	334	7	0	5	5	1.4%	(b)
FY 2015	376	8	0	6	6	1.6%	(b)
FY 2016	481	10	0	12	12	2.6%	
FY 2017	494	10	0	10	10	1.9%	
FY 2018	510	10	0	10	10	1.9%	

(a) FY 2009 represents specific EMSL maintenance forecast from the MARS system.
(b) FY 2012–2015 represents the construction of new facilities which usually have lower initial maintenance requirements.

DOE-SC = U.S. Department of Energy Office of Science.
EMSL = William R. Wiley Environmental Molecular Sciences Laboratory.
FY = Fiscal year.
MII = Maintenance Investment Index.
RPV = Replacement plant value.

...ber of facility ...es that are ...ly DOE-EM- ...and located ...the Hanford ...0 Area are ...anned for life ...on of 20 years, ...pared to a ...d exit by ...11.

D8. Deferred Maintenance Reduction

The PNNL Deferred Maintenance (DM) total in FY 2007 for its DOE-SC facility, EMSL, was $23K. The EMSL facility is the newest DOE-owned facility in the PNNL portfolio and while there has been some DM in past years, it is has been minimal. This building is categorized as "Mission Critical" and its condition is currently rated "excellent." Due to these factors, there is no need for a table listing backlog of DM and no plan for DM reduction. PNNL does not expect to receive any of the additional FY 2007 DOE-SC funding geared toward DM reduction. DM for the EMSL facility is expected to continue to be immaterial for the next few years and the planned new CRL facilities are not expected to generate any significant DM through FY 2012.

As described in the previous section, evolving this year from the CRL project, a number of facilities that are currently DOE-EM-owned and located within the Hanford Site 300 Area are now planned for life extension of 20 years as compared to a planned exit by February 2011. These include the 318 Building, 325 Building, 331 Building, and the 350 Building Complex. This change in these four buildings life and function will expand the maintenance planning horizon from 4 years (i.e., to FY 2011) to 20 years, and hence, potentially add planned maintenance and rehabilitation efforts. This will nominally result in an increased deferred maintenance assessment.

The current reported DM for these four DOE-EM-owned buildings is approximately $5.0 million; however, this does not reflect the change to a life extension of 20 years. Actions are currently under way as part of the CRL project to define and address deferred maintenance and rehabilitation requirements of these four buildings. Upon completion of this effort, the DM will be adjusted to properly reflect the change to a life extension of 20 years.

For the balance of the DOE-EM-owned buildings in the Hanford Site 300 Area, the May 2007 Memorandum of Agreement between DOE-SC and DOE-EM has established the dates by which PNNL must vacate the 300 Area DOE-EM-owned facilities it occupies. Given the near-term disposition of these DOE-EM-owned buildings, targets for internally funded maintenance continue to be developed recognizing the shortened life cycle of the facilities yet support continuing research missions, operational safety, and environmental stewardship while avoiding renewal costs that would have been needed for mission readiness beyond 2011.

PNNL utilizes existing Whitestone/MARS (commercial off-the-shelf), Electronic Service Request (ESR) (in-house), and Maximo (commercial off-the-shelf) applications to forecast maintenance needs, to document and track deferred maintenance items, and to provide overall maintenance management. A building life-cycle management process is deployed which includes an annual review of the Whitestone/MARS facility component database by a cadre of facility engineers and building managers who supervise day-to-day maintenance and

operations of their assigned facilities. These individuals use data gained from maintenance history, real-time monitoring, utility operator tours, visual inspections, etc. to evaluate individual component and system condition to adjust forecasts and schedules for preventive maintenance (PM) and refurbishment or replacement. Components or systems that have exceeded their reliable life as identified by this process are captured in the Whitestone/MARS Backlog Maintenance Report and ESR database. On an annual basis, building engineers and building managers review the information generated through this continuing process to develop a deferred maintenance estimate for input to the FIMS database.

is not only ed to sustain its ment facilities invest in talization and rization ed to keep facilities and relevant.

D9. Recapitalization and Modernization

As directed within DOE Order 430.1, PNNL is not only required to sustain its government facilities, as described in Section D7 of this document, but to invest in recapitalization and modernization structured to keep existing facilities modern and relevant. These investments should be in the form of alterations or betterments designed to enable PNNL to continue serving national mission needs.

PNNL is currently undergoing a major facilities transformation as a part of the overall plan to clean up the Hanford Site. PNNL plans to vacate a number of 300 Area facilities, retaining four main facilities. EMSL is specifically planning a programmatically funded recapitalization plan over the next several years.

The facilities and infrastructure recapitalization and modernization discussed in this section is achieved by investing IGPP, line item funding, and GPP dollars. Each type of funding will be discussed separately below. PNNL uses the Capital Asset Management Process (CAMP) to evaluate and prioritize these individual investments.

Institutional General Plant Projects (IGPP) and General Plant Projects (GPP)

PNNL received approval for use of IGPP as an appropriate source of capital funding in January 2005. The current approved definition of IGPP for use at PNNL is as follows:

- All general infrastructure needs (excluding an initial complement for a new building) such as utilities and telecommunications corridors, parking lots, pedestrian walkways, landscaping projects, and road systems.

- General-purpose facility needs where the major occupants are support staff (i.e., support buildings) providing services such as maintenance support, fabrication, waste treatment and disposal, records storage and warehousing, and general office support.

During the creation of the FY 2007 TYSP, PNNL was asked to respond to a Scientific Laboratory Infrastructure (SLI) initiative that will eliminate the availability of GPP funds as of FY 2009. Effective FY 2009, all projects less than $5 million will be completed using IGPP dollars. The proposal also calls for redefining the IGPP parameters that would allow for more flexibility.

Listed below are planned projects that will use either GPP or IGPP funds as noted.

1. **GPP Projects through FY 2008.** GPP funds will be used to support multiple projects on the PNNL campus through FY 2008. Projects include:

   - Office Space Expansion. A 15,000 gsf office space addition at EMSL (Figure D9.1) is currently under construction.

   - General Purpose Research Facility. PNNL is constructing a stand-alone, General Purpose Research Facility, using GPP funds, at a cost of under $5 million. This building is an FY 2007 start and would provide up to 10,000 gsf consisting of both wet and dry laboratory space. This project is planned for completion at the start of FY 2009.

   - Utilities infrastructure upgrades at EMSL (chilled cooling capacity, MS4 electrical switchgear).

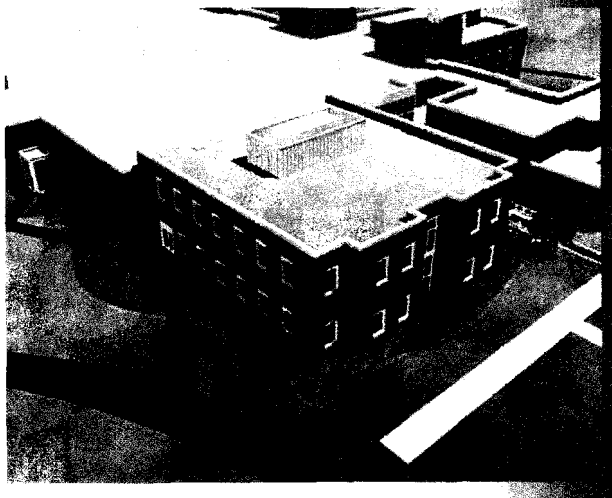

Figure D9.1. FY 2007 EMSL Office Addition

2. **CRL Project-Related Actions.** As part of the revised CRL project plan, four 300 Area buildings will be retained. Both GPP and IGPP funds, as well as expensed funded, will be used to support modernizing the 318, 331, and 350 buildings.

3. **Laboratory Rehabilitation and Improvement.** Between FY 2009 and FY 2018, PNNL plans to invest an estimated $25.4 million in laboratory rehabilitation and improvement. PNNL anticipates that when detailed planning for these items is complete a portion of this investment will be IGPP and a portion will be expensed.

4. **Utilities, Roads, and Grounds.** Over the next 10 years, the PNNL campus will change significantly with the arrival of multiple new facilities. New buildings will be accompanied by the need for upgraded infrastructure including roads, parking lots, utility systems, and telecommunications. PNNL is expecting to invest up to $14.2 million between FY 2008 and FY 2018 in IGPP funds and overhead funds related to various projects including infrastructure needs. Initial plans include upgraded electrical infrastructure and service roads and parking lot additions on the PNNL campus south of Horn Rapids Road. Outyear plans will include projects on all of the PNNL campus.

5. **Support Facilities.** Between FY 2009 and FY 2018, PNNL is projecting the need for new support facility space. Three potential projects have been identified.

- **EMSL Machine Shop.** The machine shop located within the EMSL facility supports the entire PNNL campus and is in need of an expansion.

- **IT Hosting Facility.** PNNL has plans to build an 8,000-square-foot IT hosting facility to house the core networking as well as phone system capabilities of the laboratory. Core servers, supporting systems such as Payroll, Finance, Legal, and Human Resources will be relocated from leased facilities and managed from this site. IGPP funds will be used for this project and is expected to be initiated in FY 2013.

- **Storage/Warehouse.** Storage and warehousing space is very limited at PNNL. Most of the existing storage space is being decommissioned as part of the 300 Area closure and will be moved into a short-term leased facility. PNNL is considering the construction of a new 12,000-gsf facility, using IGPP funds, to provide adequate storage as well as shipping and receiving needs. This project is planned for FY 2017 but may be built sooner as priorities are evaluated.

Table D9.1 contains the proposed funding schedule for IGPP.

Table D9.1. Proposed Funding Schedule for IGPP

	IGPP (in $M)
FY 2007	0.5
FY 2008	2.0
FY 2009	1.5
FY 2010	1.5
FY 2011	3.0
FY 2012	5.0
FY 2013	7.2
FY 2014	6.3
FY 2015	6.7
FY 2016	6.3
FY 2017	5.8
FY 2018	6.8

FY = Fiscal year.
IGPP = Institutional General Plant Project.

Line Items

Over the next 5 years, PNNL is planning DOE line item actions that are in various project stages. The PSF project is an approved DOE project that will

provide facilities that address the 300 Area closure. The EMSL North Lab/Office Expansion Project is planned as an FY 2010 Line Item project start (CD-0) to provide in FY 2014 expanded national scientific user facility capabilities. Lastly, PNNL is pursuing a line item proposal as part of the proposed FY 2009 SLI Initiative. The SDL will provide space for chemistry and processing and sensing and measurement capabilities.

1. **Physical Sciences Facility**. Line item funding will play a major role in the changing face of the PNNL campus over the next 10 years. The PSF line item project is being funded by DOE-SC, NNSA, and DHS. This project will construct approximately 201,000 gsf of laboratory and office space to accommodate a portion of the existing research capabilities being displaced as a result of the closure and cleanup of facilities in the Hanford 300 Area (Figure D9.2). This project will also provide line item funds to modernize the 325 Radiological Processing Laboratory (RPL), which is a 144,820-gsf facility. The PSF project is scheduled to initiate construction during the fourth quarter of FY 2007.

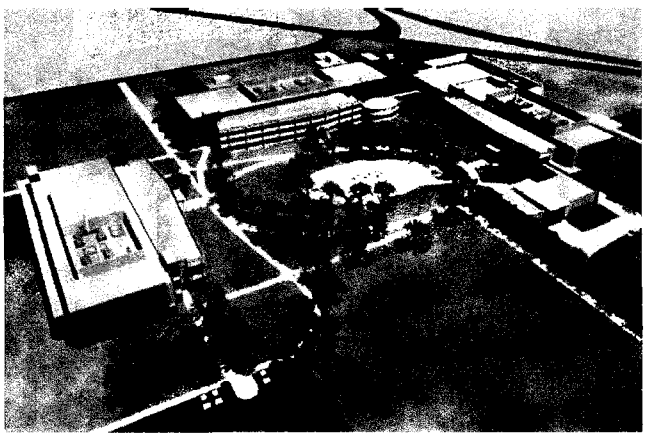

Figure D9.2. Physical Sciences Facility

2. **System Development Laboratory**. As part of the proposed SLI Initiative, PNNL has proposed the construction of a 150,000-gsf, $90 million SDL that would provide replacement laboratory and office space currently being provided through two separate leases located away from the main PNNL campus. Funding for this project is expected to span three fiscal years (FY 2013 – $12 million, FY 2014 – $55 million, and FY 2015 – $23 million). Other project costs (OPC) is expected to be funded through PNNL overhead.

3. **EMSL Expansion**. PNNL is proposing a $30-million programmatic line item expansion to the EMSL facility with design and construction starting in FY 2012 and completion in FY 2014. The project would include the construction of two laboratory modules on the north end of the building with an accompanying office pod extending east. The EMSL facility is in need of both additional laboratory and office space.

Today, PNNL 4,100 staff me conduct researc activities on a Consolidated Laboratory cam composed of 101 buildings over 2 million feet.

The Project Engineering and Design (PED) effort is expected to be approximately $2 million. Funding for this project is expected to span three fiscal years (FY 2012 – $4 million, FY 2013 – $17 million, and FY 2014 – $9 million). OPC is expected to be funded through a combination of PNNL overhead and direct program funding.

Programmatic General Plant Projects

DOE Office of Science Biological and Environmental Research (BER) program is planning on providing Programmatic GPP funds specific to the EMSL facility for general plant projects. These are in the planning stage and are not reflected in Attachment 4 (IFI Crosscut).

1. **EMSL Radiological Annex**. The EMSL Rad annex addition will support enhanced research capabilities in the radiological actinide area. A complement of EMSL's unique research capabilities will be housed in the annex. The annex is planned to be physically separate from the EMSL facility, thus isolating radiological activities, only relying on EMSL for such things as compressed air, nitrogen, and electrical power.

2. **South Electrical Plant**. The south electrical plant will support the current and future super-computer capabilities within the EMSL. The existing plant, north, is fully utilized both in utilities and space. The major need for power and cooling is driven by the existing and future computer facility. Placement of this additional plant next to the computing facility will reduce costs of running utilities from the north end of the building to the south end.

3. **Computer Room Addition**. The computer room addition will support the next super-computer generation, High Performance Computing System-4 (HPCS-4). The current space does not lend itself to the next-generation technologies of condensed computer arrangements with proper cooling and short-run cable connections. The existing computer space will be used for other computer housing.

Rehabilitation and Improvement Costs

Rehabilitation and Improvement Costs (RIC) is a required field within FIMS for all DOE-SC owned facilities. The only DOE-SC-owned facility at PNNL is the EMSL with a current reported RIC value of approximately $19 million. RIC is currently not captured for the DOE-EM facilities operated by PNNL; however, these facilities are being rehabilitated as part of the CRL project. RIC values will be revised during the planned FIMS update schedule as projects related to RIC are better defined.

D10. Space Bank Analysis

In FY 2002, Congress established requirements for offsetting the acquisition of new space with the elimination of an equivalent amount of space at each site. The DOE Headquarters Chief Financial Officer issued general implementation guidance for space banking in an August 9, 2002, memorandum, and the Director of the DOE-SC issued corresponding implementation guidance on February 26, 2003.

In the space management guidance, the "list of sites requiring the balancing of new construction and elimination of excess" specifies PNNL as part of the "Hanford Reservation." Even though DOE formed an autonomous PNNL site in 2005, the definition of the "Hanford Reservation" for the purposes of space banking was confirmed in a November 2005 communiqué from a DOE Office of Engineering and Construction Management (DOE-OECM) Realty Specialist. Therefore, PNNL will seek to coordinate a transfer of banked space eliminated by DOE-EM on the Hanford Site to DOE-SC for use in PNNL's new construction (per the guidance this transaction can be accomplished at the local level). To be most effective, "batch" transactions will be pursued, rather than seeking the transfer of banked space on a project-by-project basis. The magnitude of the request from DOE-EM will be an appropriate amount of square feet to cover the expected growth of PNNL over the next 10 years. Table D10.1 shows PNNL federal facilities are expected to grow approximately 536,000 gsf over the next 10 years, and is the current additional space banking requirement. The space is depicted in the year of beneficial occupancy.

In FY 2002, Congress establi... requirements fo... offsetting the acquisition of n... space with the ... elimination of a... equivalent amo... space at each si...

Table D10.1. Forecasted Growth of PNNL Federal Facilities (in gross square feet)

		FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Physical Sciences Facility	SC/NNSA/ DHS Line Item					201,000							
EMSL North (Lab and Office addition)	SC Line Item								55,000				
System Development Laboratory	SC Line Item									150,000			
EMSL Computer Room	GPP	4,000											
EMSL Office Expansion	GPP		15,000										
General Purpose Research Facility	GPP			10,000									
IT Hosting Facility	IGPP							8,000					
Shipping/ Receiving	IGPP											12,000	
EMSL Machine Shop Expansion	IGPP						5,000						
EMSL Annex	Program				10,000								
EMSL Computer Room	Program						4,000						
EMSL S. Electrical Plant	Program					5,000							
Contingency													57,000
		4,000	**15,000**	**10,000**	**10,000**	**206,000**	**9,000**	**8,000**	**55,000**	**150,000**	**0**	**12,000**	**57,000**
													536,000

DHS = Department of Homeland Security.
EMSL = William R. Wiley Environmental Molecular Sciences Laboratory.
FY = Fiscal year.
GPP = General Plant Project.
IGPP = Institutional General Plant Project.
IT = Information Technology.
NNSA = National Nuclear Security Administration.
PNNL = Pacific Northwest National Laboratory.
PSF = Physical Sciences Laboratory.
SC = U.S. Department of Energy Office of Science.

D11. Performance Indicators and Measures

PNNL currently uses a well-established set of performance measures and is in the process of implementing a number of additional facility and space management performance measures to provide a more complete performance assessment. Most all these measures have been established with input and concurrence of PNSO. The collection of performance measures can be categorized as contract performance measures or system performance measures. Contract performance measures are those measures that have been incorporated in the PNNL 2007 Performance Evaluation and Measurement Plan (PEMP). System performance measures are defined as non-contract measures that PNSO may be using as part of PNNL oversight. These two types of performance measures are described separately below.

PNNL currently uses a well-established set of performance measures.

Contract Performance Measures

PNNL measures of successful facility management stewardship in maintenance and operations using six key performance measures described below, as well as the system performance measures of "occupants per capacity" and "percent laboratories billed." In aggregate, these eight items are incorporated in the PNNL 2007 PEMP.

Asset Condition Index (ACI) – DOE's corporate measure of the condition of its facility assets. It reflects the outcomes of real property maintenance and recapitalization policy, planning, and resources decisions. ACI = 1 – FCI. FCI (Facility Condition Index) is the ratio of DM to RPV.

Maintenance Investment Index (MII) – a measure of the annual expenditure for maintenance as compared to RPV for DOE-SC-owned real property assets. This performance indicator was selected to emphasize the annual level of investment required for maintenance and repair. It establishes an accountability reference of facility stewardship and reflects comprehensive institutional planning with regard to overall maintenance planning. Note that the reported MII includes capital investments; this is inconsistent with FIMS requirements but better reflects the true level of investment.

Energy Performance Measure – measures the execution of goals within the PNNL FY 2007 Energy Management Performance Agreement document.

Asset Utilization Index (AUI) – DOE's corporate measure of facilities and land holdings against requirements. The AUI is the ratio of the area of operating facilities or land holdings justified through annual utilization surveys to the area of all operational and excess facilities or land holdings without a funded disposition plan.

Facility Reliability Index – a measure associated with enabling the Laboratory mission through high facility reliability as defined by the index. This is a

measure of research impact because of unplanned service outages as a result of an act of omission or commission by F&O during the fiscal year.

Operational Performance Measure – measures effective management of facility operating boundaries; protecting staff, public, and the environment; enabling mission execution; and preventing creation of unplanned future facility legacies or liabilities (e.g., start clean – stay clean tenants) as measured through the effective implementation of the Laboratory Facility Use Agreements for existing and future facilities.

System Performance Measures (Non-Contract Measures)

has also shed a on of key space gement nance measures the PNNL PEMP...

PNNL has also established a collection of key space management performance measures outside the PNNL 2007 PEMP, which are described below. This information is being used to allow PNNL to more effectively and efficiently manage its entire portfolio of space holdings and meet the intent DOE's Real Property Asset Management Plan.

Office Space Utilization

A number of different metrics are available to collectively provide an assessment on a Laboratory-wide basis. Measures that PNNL currently uses for Office Space Use are:

- Number of occupants in office space divided by capacity estimated from office type (% use)
- Number of unoccupied offices
- Office square feet per office occupant.

These metrics are provided by organization and building.

Laboratory Space Utilization

A more challenging utilization measure is that of laboratory space use. Utilization guidelines regarding AUI have typically focused on net square footage in a facility that is occupied. For the purposes of this metric, PNNL uses the percent of laboratory space billed through PNNL's space chargeback system. This chargeback system has served PNNL well over the last several years by providing incentives for organizations to exit poorly used space, allowing the Laboratory to disposition older, lower-quality research buildings. However, over the last 3 years, demand for laboratory space has increased while at the same time 300 Area accelerated closure has forced PNNL to exit several laboratory spaces that in the past have provided incremental capacity. Because of this, very few laboratory spaces are not being used to some degree, with virtually no space available for incremental programmatic needs.

To address this newer challenge, PNNL has recently developed an analytic basis for laboratory space management that explicitly treats lab space as a business resource; that is the utilization of laboratory space is measured in terms of the efficiency with which it serves our research business. The specific metric is a measure of the research FTEs working on projects per a nominal research laboratory space. A comparison of this measure between facilities and organizations enables better targeting of opportunities for enhanced performance.

D12. Energy Management

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consumption.

PNNL has made significant progress toward meeting DOE reduction goals for energy consumption. Through a proactive energy management program and investment in facility infrastructure, PNNL has reduced its energy consumption per square foot by 44% in the Laboratory and Industrial Facility category and by 40% in the General Building category during the past 15 years. Conservation and efficiency improvement are crucial components of PNNL's Energy Plan (August 2006). Energy efficiency is the ability to use less energy to produce the same amount of useful work or services. Energy conservation is closely related and is simply using less (usually by eliminating needless use or wasteful practices). Improved energy and water efficiency and conservation reduce consumption and costs while maintaining PNNL facilities mission ready.

During the past 10 years, PNNL has significantly improved its energy efficiency by developing and expanding the use of energy-efficient technologies. If PNNL had continued to operate today's facilities as they were operated 10 years ago, the cost for energy would be $4 million/year more than the actual FY 2006 expense. The avoided energy use (savings) translates to over 19 million kWh and 3.4 million therms per year (Figure D12.1). The driver for saving energy was cost savings, but the focus was provided by performance agreements with DOE through DOE Order 430.2a, *Departmental Energy and Utilities Management.*

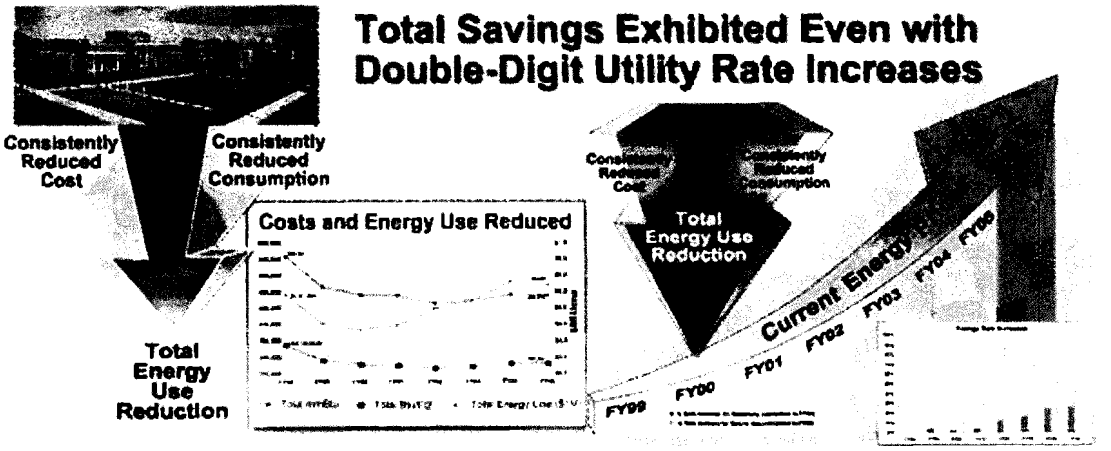


Figure D12.1. Energy Reduction Achievements at PNNL – Last 10 Years

PNNL's strategy for consuming less energy has included:

- Promoting energy-efficiency strategies. Communicating energy-efficiency tips to staff through the Laboratory's biweekly newsletter.
- Performing periodic building recommissioning and eliminating energy inefficient buildings.

- Installing WattStopper motion sensor power plug strip technology in offices and laboratories and deploying computer monitor energy savings settings via the PNNL network. These measures can reduce the overall electrical energy use by as much as 4% if sustained by continued deployment.

- Retrofitting lighting systems and installing motion sensors and separate lighting circuits to allow turning off unneeded lights.

- Using solar-powered lighting. In FY 2004, as a technology demonstration project, PNNL replaced six parking lot lights with solar-powered parking lot lights.

- Monitoring total facility demand and demands for individual equipment major loads.

- Identifying load-reduction measures for PNNL in the event of rolling blackouts or mandatory load reductions of either natural gas or electricity.

- Developing metering plans for evaluating buildings that do not currently have metered data or improving the energy efficiency of office buildings to obtain the ENERGY STAR® label. Currently, three buildings have achieved the Energy Star label (Sigma II, Sigma III, and the User Housing Facility).

- Encouraging energy efficiency and conservation to PNNL occupants through a Conserving Energy and Water website and through messages from the Laboratory Director's desk.

- Providing training opportunities on smart energy practices so that PNNL staff can practice energy efficiency year round.

- Purchasing energy-efficient appliances, office equipment, lighting, utility systems, etc., institutionalizing the weigh-in of energy efficiency and conservation into purchasing practices. This includes the selection of DOE/EPA ENERGY STAR®products. Computers and peripheral equipment selected in the Managed Hardware Program comply with advanced energy efficient criteria developed by the computer industry (*Energy Policy Act of 2005* [EPAct 2005] – Sect 104).

- Implementing variable frequency drives on motors in the 300 Area.

- Utilizing Energy Savings Performance Contracts (ESPC) to fund major projects to reduce energy use (EPAct 2005 – Sect 105).

During the past 10 years, PNNL significantly improved its energy efficiency by developing and expanding the use of energy-efficient technologies.

ergy Policy 2005 requires facilities to 2% energy per year over 10 years.

Energy Reduction Goals and Strategy – Next 10 Years

The EPAct 2005 requires federal facilities to achieve 2% energy savings per year over the next 10 years using FY 2003 as the baseline year (EPAct 2005 – Sect 102). More recently, the new Executive Order 13423 has offered a set of high level goals to strengthen federal environmental, energy, and transportation management. In response to this executive order, DOE has drafted a more definitive set of TEAM goals. Meeting some of these goals will be difficult because PNNL has already achieved significant savings and because energy use is increasing due to increasing capabilities such as computer servers and supercomputers. PNNL has responded to these draft TEAM goals and will continue the past energy efficiency strategy including the following:

- Establish a Site Metering Plan that identifies meters to be installed according to the guidelines of the DOE Metering Plan and install 100% of the meters identified in the Site Plan by the year 2012. The TEAM goal is to accomplish this by calendar year (CY) 2011 and modifying PNNL's advanced metering plan to meet this is achievable. The PNNL goal is a 15% energy savings due to improved awareness, identification of operations and maintenance improvements, implementation of energy conservation/ efficiency measures, and continuous management attention in a timely manner.

- The majority of economically viable energy conservation projects have been completed, leaving little potential for additional ESPC opportunities. Additional energy savings is technically possible, but based on previous energy audits the payback period extends beyond a reasonable return period. While PNNL does not plan to pursue ESPC funding, we will be seeking funding from the Bonneville Power Administration's Rebate Program for energy reduction measures we are including in our PSF Horn Rapids Triangle Project. Even with the inclusion of energy efficiency measures in the new facilities, our current assessment is that an additional 30% reduction by 2015 will be difficult to realize. However, an executable plan will be put in place to allow PNNL to address this energy challenge by 2015.

- The new line item-funded facility (PSF) is intended to be Leadership in Energy and Environmental Design (LEED)® certified. In addition, two current GPP-funded projects (EMSL office addition and the General Purpose Research Facility) are being constructed as LEED® certifiable. Meeting proposed TEAM goals for LEED® certification assumes that LEED® certification for laboratories can be broadly utilized. Achieving LEED® Gold certification for Laboratory facilities will be a significant challenge without the U.S. Green Building Council's (USGBC) approval of a LEED® certification system specifically for laboratories (currently a draft has been developed for USGBC by Labs21.) This is also true for meeting TEAM goals for major renovations. PNNL currently utilizes the LEED®

criteria in a graded approach for the design of existing building upgrades and isolated building system modifications and/or upgrades.

- To the extent that it is economically feasible and technically practicable, at least 3% of electricity purchases annually will be from renewable energy sources. This can include Renewable Energy Certificates.

- New buildings (those for which design for construction begins on or after January 3, 2007) will be designed to use 30% less energy than the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) 90.1 2004 standard, if life-cycle cost effective.

- PNNL has a Comprehensive Energy Management Plan (CEMP) that is annually updated and includes energy management initiatives and meets the minimum requirements of DOE O 430.2A, *Departmental Energy and Utilities Management.*

The table below represents a 3-year polling timeline reflecting energy consumption (Btu/sq ft) targets to FY 2015.

	Baseline	Actual	Target					
	FY 2005	FY 2006[a]	FY 2006	FY 2007	FY 2008	FY 2009	Long Term	Achieve Target
Operating Costs – Energy Consumption (Btu/sq ft), 2005 *Energy Policy Act*, 20% reduction from 2003 baseline by 2015	FY 2003 Baseline 197,970	200,199	194,011	190,051	186,092	182,132	158,376	2015
Operating Costs – Energy Consumption (Btu/sq ft), Executive Order 13423 3% annual reduction or 30% reduction by 2015	FY 2003 Baseline 197,970	200,199	192,031	186,092	180,153	174,214	138,579	2015

(a) Includes Renewable Energy Credit.
FY = Fiscal year.

...ased space ...ts for 37% of ...'s square foot ...oldings.

D13. Leasing and Third-Party/Non-Federal-Funded Construction of New Buildings

As discussed in Section B, Overview of Site F&I, PNNL's current facilities profile consists of 2,085,000 square feet, of which approximately 776,000 square feet represents contractor-leased space. In addition, a number of third-party facilities are planned for construction in the next 5 years to then be leased for the long term. This section describes existing leased facilities, PNNL's long-term leasing strategy, anticipated future leases, and other indirect funding that supports modernization of PNNL's campus.

Existing Leased Facilities

Leased facilities account for a significant portion of the PNNL portfolio and primarily provide suitable office space and some general laboratory space. The leased space accounts for 37% of PNNL's square foot space holdings. The lease portfolio consists of 23 leases and one General Services Administration (GSA) service agreement, of which 17 are greater than 10,000 square feet. Table D13.1 contains a list of the leases and service agreements over 10,000 square feet.

Table D13.1. PNNL Leased Facilities

Facility Lease	Square Feet	Rate Period	Number of Options Remaining	Initial Date
Sigma II	20,100	10/1/2006–9/30/09	2–1 year priced options	10/25/2000
Sigma III	20,090	4/1/2007–3/31/2009	1–1 year option	3/16/1993
Sigma IV	20,530	6/1/2005–5/31/08	2–1 year priced options	6/1/2005
Sigma V	47,900	7/1/2006–6/30/2011	1–5 year option	7/10/1981
Laboratory Support Building (LSB)	83,921	3/9/04–9/30/2009	1–5 year priced option	3/1/2004
College Park Maryland	12,346	10/1/2001–5/30/2007	Month to month[a]	10/1/2001
Port of Pasco (Hangar)	10,000	10/1/2004–9/30/2007	No additional lease options	11/1/1985
User Houser Facility (UHF)	29,108	5/18/2001–9/30/2011	5 year priced option with 2–5 year priced options left	5/18/2001
National Security Building (NSB)	100,358	10/1/2003–9/30/2008	5 year priced option with 3–5 year priced options left	5/17/1993
Environmental Technology Building (ETB)	100,358	10/1/2004–9/30/2009	5 year priced option w/3–5 year priced options left	9/2/1994
ISB-I	50,200	10/1/2007–9/30/2017	No additional options left	6/15/1990
ISB-II	60,080	10/1/2007–9/30/2017	No additional options left	12/18/1991
2400 Stevens	95,351	10/1/2002–9/30/2007	1–5 year option left	3/22/1984
Advanced Processing Engineering Lab (APEL)	57,196	10/1/2007–9/30/2012	1–5 year option left	10/17/1998
Battelle Seattle Research Center (BSRC)	20,725	5/01/2004–4/30/2011	No additional lease options[b]	5/1/2004
Battelle Washington Office (BWO)	36,949	10/1/2003–9/30/2007	No additional lease options[c]	10/17/1988
Consolidated Information Center	30,124	4/1/1997–3/31/2010	Service Agreement with General Services Administration	4/01/1997

(a) This building is scheduled for demolition. The lease is month to month while a new location for this office is found.
(b) No formal lease for this space. Space is paid for through an Interlaboratory Agreement (ILA) with Battelle Memorial Institute (BMI).
(c) Pacific Northwest National Laboratory (PNNL) is currently responsible for this lease but only occupies 27,467 square feet. The remaining space is sub-leased to other Battelle organizations or Maintenance and Operations. As of October 1, 2007, PNNL will no longer be responsible for this lease and will convert to an ILA with BMI at a significantly reduced footprint.

PNNL's leased facilities fall within three distinct types:

1. **Core**. The PNNL *Campus Master Plan* identifies a Campus Core Sector between Horn Rapids Road and Battelle Boulevard (north-south), and George Washington Way and Stevens Road (east-west) defined for general, non-radiological science facilities. All buildings in this sector are intended to support the needs of the Laboratory over the 10-year planning horizon.

2. **Flex**. The PNNL *Campus Master Plan* identifies a Flex Sector to the east of George Washington Way that primarily represents short-term leased buildings that PNNL would consider vacating as the need arises.

3. **Offsite**. The Offsite leased buildings represent special needs and may or may not be part of the long range plans of the Laboratory.

Core Sector

National Security Building (NSB)

The 100,358-square-foot NSB facility is predominantly an office building with expanded limited area capabilities requiring added protection due to its classification or general sensitivity (Figure D13.1). The National Security Directorate has around 330 staff and a variety of projects housed within the building. The mission of the NSB is to develop innovative solutions to critical national security problems by applying and deploying the entire intellect. This facility has been leased since May 1993.

Figure D13.1. National Security Building

Environmental Technology Building (ETB)

The 100,358-square-foot ETB facility is predominantly an office building with a small amount of computer laboratory space in the basement (Figure D13.2). The building contains high-quality office space, which provides an effective environment for client discussions and serves as a centralized office location for the leadership teams of the Fundamental Sciences and Environmental Technology directorates. These two research directorates and their support personal make for around 330 staff members and a variety of projects housed within the building. This facility has been leased since September 1994.

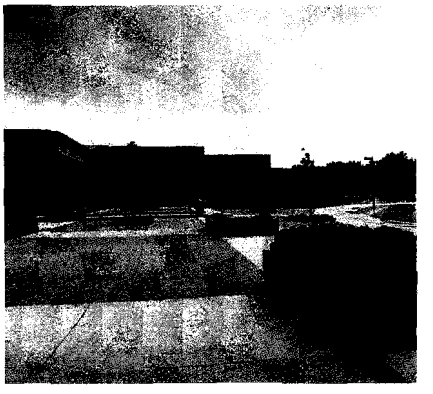


Figure D13.2. Environmental Technology Building

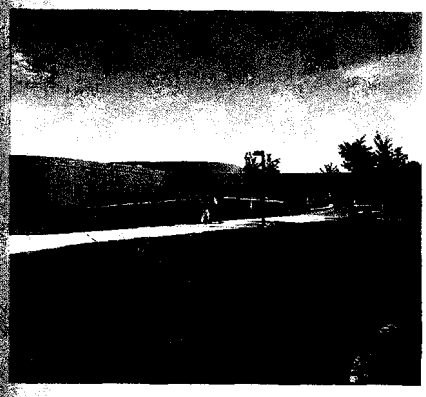


Figure D13.3. Information Sciences Building I

Information Sciences Building I (ISB-I)

The 50,200-square-foot ISB-I facility is predominantly an office building with a small amount of computer laboratory space throughout the building (Figure D13.3). The building contains high-quality office space and houses approximately 210 staff with the primary occupant being the Computational and Information Sciences Directorate. This facility has been leased since June 1990.

Information Sciences Building II (ISB-II)

The 60,080-square-foot ISB-II facility is predominantly an office building with some key computer laboratory space including the central computer infrastructure for the entire Laboratory that is housed in the basement. The building contains high-quality office space and houses approximately 250 staff with the primary occupant being the Business Applications component staff within the Computational and Information Sciences Directorate. This facility has been leased since December 1991.

User Housing Facility (UHF)

is engaged in efforts to e efficiency of leases.

The 29,108-square-foot User Housing facility currently serves as a guest house to provide 81 private rooms for visitors (Figure D13.4). Conveniently located on the PNNL campus, the UHF is within easy walking distance to most PNNL research facilities and many other Hanford contractor and subcontractor facilities. The UHD is a non-smoking, gated complex that includes landscaped inner courtyards and numerous amenities. This facility has been leased since May 2001.

Figure D13.4. User Housing Facility

All of these spaces are important to the continued operation of PNNL and are critical to the long-term future of PNNL and, hence, are being worked to obtain longer-term options at a reasonable cost to PNNL.

Flex Sector

Sigma II Building

The 20,100-square-foot Sigma II facility currently serves as an office building providing a central location to house 85+ research staff. The two primary occupants consist of the Statistical Sciences Group within the Computational and Information Sciences Directorate and the Technology Planning and Deployment Group within the Energy Science and Technology Directorate. This facility has been leased since October 2000.

Sigma III Building

The 20,090-square-foot Sigma III facility currently serves as an office building providing a central location to house 85+ research staff. The two primary occupants consist of the Engineered Systems Group and the Risk and Decision Sciences Group. Both groups are within the Environmental Technology Directorate. This facility has been leased since March 1993.

Sigma IV Building

The 20,530-square-foot Sigma IV facility currently serves as an office building providing a central location to house 85+ research staff. The primary occupant consists of the Safety, Licensing & Regulatory Analysis Group within the National Security Directorate. This facility has been leased since June 2005.

Sigma V Building

The 47,900-gsf Sigma V building consists primarily of office and administrative space with adjoining laboratory space (both dry and wet) and is solely occupied by the Environmental Technology Directorate (Figure D13.5). The office space (22,000 nsf) represents 71% of the net usable space and is used to house research staff and is primarily hard walled, single-occupant space. Housing 165 staff, this represents 5% of the Richland North office space. This building has 4,000 nsf of general laboratory space and 4,600 nsf of wet chemistry laboratory space. This facility has been leased since July 1981.

Figure D13.5. Sigma V Building

Figure D13.6. Laboratory Support Building

Figure D13.7. 2400 Stevens Building

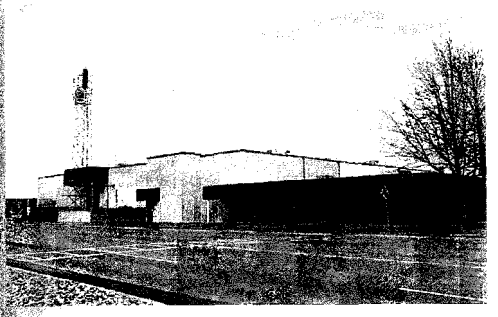


Figure D13.8. Advanced Processing Engineering Laboratory

Laboratory Support Building (LSB)

The 83,921-square-foot LSB facility currently serves as an office building providing a central location to house about 375 support staff (Figure D13.6). The three primary occupants consist of the Business Support Services Directorate, Environmental Safety and Health Directorate, and Facility and Operations Directorate. This facility has been leased since March 2004.

2400 Stevens Building

The 95,351-square-foot 2400 Stevens facility is being used as a general research laboratory (Figure D13.7). It contains multiple types of space including laboratory and office space. The office space is primarily used to house research staff working in the laboratories. There are primarily two directorates housed within the building, the National Security and Energy Science and Technology directorates. The building is a converted warehouse that has been modified and had multiple office additions added over the years. The building houses approximately 205 research staff. This facility has been leased since March 1984.

Advanced Processing Engineering Laboratory (APEL)

PNNL occupies 57,196 square feet of the APEL facility including 29,644 square feet of laboratory space (Figure D13.8). It contains multiple types of space including wet laboratories, electronic laboratories, computer laboratories, high bay, and office space. The Process Science and Engineering Division within the Environmental Technology and Energy Science and Technology directorates conduct the majority of the work in APEL. This facility was established to support entrepreneur research and limits PNNL occupancy to no more than 50%. PNNL plans on vacating this building if the proposed SDL is constructed. This facility has been leased since October 1998.

Offsite

College Park Maryland

The 12,346-square-foot College Park, Maryland, facility currently provides space to Battelle staff affiliated with the Joint Global Change Research Institute (JGCRI), located on the second floor of 8400 Baltimore Avenue, College Park. The Institute, along with the University of Maryland, conducts multi-disciplinary research in various topics related to the scientific and policy study of global energy and environment. This space includes offices and cubicles to house approximately 40 staff and students, a reception area, restrooms, a telecommunications room, elevators, stairwells, hallways, and a kitchen facility. This facility has been leased since October 2001. Because of the planned demolition of this building in the next two years, the JGCRI will be moving to a facility closer to the University of Maryland in the next twelve months.

Port of Pasco (Hangar)

The 10,000-square-foot hangar facility currently consists of administrative, maintenance, and airplane hangar space in Building 71 at the Pasco, Washington, airport. This space has been used to house a Gulfstream G1 aircraft as well as provided space for research staff to work on and store equipment and computers. This facility has been leased since November 1985.

Battelle Seattle Research Center (BSRC)

The BSRC is located at 1100 Dexter Avenue in Seattle, Washington, and is identified as the Dexter Building. This is a Battelle Memorial Institute lease that consists of 49,773 gsf of office space, of which PNNL occupies approximately 20,725 square feet in support of various research programs. Currently, PNNL has over 50 staff housed in the space, who are primarily National Security Directorate staff supporting numerous DOE, other government agencies, and commercial programs. Other space includes computer laboratories, limited areas, an instrumentation laboratory, conference rooms, and other common space areas. This facility has been leased since May 2004.

Battelle Washington Office (BWO)

The 36,949-square-foot BWO facility (Figure D13.9) is being used to provide key work locations for Battelle staff working on temporary assignments or located within the Washington, D.C. area. The BWO provides office and administration space for the conduct of paper studies, policy reviews, and conventional administrative work

Figure D13.9. Battelle Washington Office

activities. Other national laboratories utilize a portion of the space through access agreement establishments. The building houses approximately 20 PNNL staff on a regular basis along with numerous visitors throughout the year. This facility has been leased since October 1988. Effective October 1, 2007, PNNL will no longer be responsible for this lease. Battelle Memorial Institute will take over the lease and PNNL will only be responsible for the space it occupies. Payment for this space will be year to year through an Interlaboratory Agreement (ILA).

Consolidated Information Center (CIC)

The CIC is a 70,000-square-foot facility owned and operated by Washington State University Tri-Cities (WSU-TC). PNNL's Hanford Technical Library co-occupies 30,124 square feet with the WSU-TC library staff. PNNL's library is within the Communications and External Relations Directorate. The space is not covered by a direct contractor lease, but PNNL pays a service assessment to DOE-RL, who pays GSA for amortization of the federal government's portion of the original funding of the facility, shared by WSU and GSA. PNNL also pays WSU-TC for phone service, copiers, and related operational costs. PNNL has occupied the facility since completion of the construction in April 1997. PNNL intends to occupy this facility for the foreseeable future and with occupancy of BSEL, activities on the WSU-TC campus will become core to the PNNL's overall campus. For the purposes of this document, the CIC and BSEL have been treated as core facilities.

...ntly, PNNL is ...ating the ...e exit of select ...acilities over ...t 2 to 4 years, ... campus is ...ed and ...idated.

Long-Term Leasing Strategy

In the spirit of continual improvement, PNNL is engaged in several efforts to improve efficiency of current leases. PNNL is in the process of renegotiating long-term agreements at reduced lease rates for the five core leases on Q Avenue within the Core Sector of the campus. ISB-1 and ISB-2 have been completed, and NSB, ETB, and UHF remain to be addressed. If fully successful, the renegotiated leases will significantly reduce the total lease costs and lease rate obligations.

PNNL will also evaluate the continuing need for flex sector office space as core facilities are constructed and mission requirements evolve. Currently, PNNL is evaluating the possible exit of select leased office facilities over the next 2 to 4 years, as the campus is reshaped and consolidated.

Future Third-Party Leased Facilities

The acquisition strategy approved as part of CD-1 R for the CRL project includes three facilities: the PSF, which will be federally funded, and CSF and BSF, which will be developed by a private entity and leased. Both third-party facilities are scheduled for occupancy in FY 2009, and have a preliminary combined footprint of 148,000 gsf. The leases for both third-party facilities will be

structured in accordance with the latest DOE and Office of Management and Budget guidance. The third-party business case for these is expected to be approved before the end of FY 2007.

An additional third-party leased facility, BSEL, is planned for completion and occupancy in the first half of FY 2008. This 57,000-square-foot building is a $24-million joint effort between WSU and PNNL, of which, PNNL will occupy approximately 31,000 square feet.

Additional information on the above leased facilities can be found in Section C.

As described in Section D3, Land Use Plans, other leased facilities will be considered within the "flex sector" as the need arises.

Indirect Funding

In addition to alternative financing and lease arrangements, other investments are being made to meet the requirements for a fully modern PNNL campus.

The State of Washington, through the City of Richland, is investing $5 million to provide utility systems infrastructure on the Horn Rapids Triangle. In the future, it is anticipated that additional utility systems infrastructure on the PNNL campus will be provided via a combination of IGPP, overheads, and financial arrangements with the various utility providers.

The State of Washington, th[rough] the City of Ric[hland] is investing $5 million to p[rovide] utilities infrastr[ucture] to the PNNL campus.

In addition, PNNL is planning to invest $32 million overhead for CRL Transition activities and $3 million in expense modifications for some of the 300 Area retained facilities. These activities are described in Section D4 and include the activities necessary to relocate capabilities and transition facilities to DOE-EM for disposition.

PNNL also anticipates future expense investments to upgrade facilities in addition to the capital investments, as well as arrangements for leased facility modifications and upgrades through augmented lease arrangements.

D14. Operating Costs for Sustainment and Operations

Facility sustainment provides resources for maintenance and repair activities necessary to keep a typical inventory of facilities in good working order over a specified service life. It includes regularly scheduled adjustments and inspections, preventive maintenance tasks, and emergency response and service calls for minor repairs. It also includes major repairs or replacement of facility components that are expected to occur periodically throughout the facility life cycle. This work includes regular roof replacement, refinishing wall surfaces, repairing and replacing electrical, heating, and cooling systems, replacing tile and carpets, and similar type of work. While PNNL does not currently have a DM reduction program for DOE-SC real property assets as none was required, if one was to exist it would be reported in this cost element as well.

Sustainment does not include restoration, modernization, environmental compliance, specialized historical preservation, or costs related to acts of nature, which are described elsewhere in this plan.

associated with operations grounds, ...rial, pest ..., refuse, ...ing, and snow ...al are included ... of the ...ions Cost ...

Tasks associated with facilities operations such as grounds, janitorial, pest control, refuse, recycling, and snow removal are included as part of the Operations Cost element. Operating costs associated with utilities are covered in Section D12.

Table D14.1 illustrates current performance for Sustainment/DM Reduction and Operations costs for the DOE-SC EMSL at PNNL along with the long-term DOE-SC performance targets.

Table D14.1. Operating Cost Goals and Objectives for Sustainment and Operations Costs for DOE-SC-Owned Buildings in PNNL Portfolio

Performance Measures	Baseline	Actual	DOE-SC Target				
	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Long Term	Achieve Target
Sustainment and DM Reduction ($/sq ft)	$8.94	$8.94	$7.00	$7.25	$7.50	$9.00	2014
Operations ($/sq ft)	$3.04	$3.10	$1.30	$1.35	$1.35	$1.35	2008

DM = Deferred maintenance.
DOE-SC = U.S. Department of Energy Office of Science.
FY = Fiscal year.
PNNL = Pacific Northwest National Laboratory.

As described in previous sections, evolving this year from the CRL project, a number of facility complexes that are currently DOE-EM-owned and located within the Hanford Site 300 Area are now planned for life extension of 20 years. These include the 318 Building, 325 Building, 331 Building, and the 350 Building Complex. This change will expand the maintenance planning horizon from 4 years (i.e., to FY 2011) to 20 years, and hence, potentially add

planned maintenance and rehabilitation efforts. For the EMSL, PNNL is currently achieving the long-term performance target for Sustainment/DM Reduction.

The operating costs shown are only for the single high-lab-intensive EMSL facility and therefore are not representative of a typical lab-wide averaged operating cost. Thus, direct comparison to the target is not appropriate. A more appropriate comparison is to "factored gross square feet," which takes into account requirements for various facility types. In addition, janitorial costs account for ~62% of the total operating cost. PNNL benchmarking activities have indicated that while labor rates are above average, PNNL is more efficient in terms of area cleaned per janitorial FTE.

Attachment 1

Land Use Plan

The Land Use Plan at PNNL is based on the PNNL *Campus Master Plan* that was updated in July 2005 and is planned to be updated again at the end of 2007. This attachment contains excerpts extracted directly from this plan.

Attachment 1

Land Use Plan

1.1
Executive Summary

Battelle Memorial Institute (Battelle), operator of Pacific Northwest National Laboratory (PNNL) for the U.S. Department of Energy (DOE), selected a design team to prepare this *Campus Master Plan Update* report to update the existing *Campus Master Plan* prepared in 2002, and to integrate the master plan with the development of conceptual design for the Capability Replacement Laboratory (CRL). Conceptual design for the CRL is documented separately in the *Conceptual Design Report* (CDR) supporting PNNL's Critical Decision-1 (CD-1) submittal to DOE. The master plan will also support PNNL's required annual update of its *DOE Ten Year Site Plan.*

This *Campus Master Plan Update* provides an analysis of the existing PNNL campus and recommendations to accommodate anticipated growth for the next 20 years and beyond, and to dramatically transform PNNL into a dynamic, integrated, and more pedestrian-oriented campus.

Existing PNNL facilities total ~2,085,000 gross square feet (gsf). This includes space currently occupied in the 300 Area of the Hanford Site, a large portion of which will be demolished and replaced with new space on the PNNL campus by the CRL project. The master plan illustrates a campus capable of growing to nearly 4,800,000 gsf if needed to meet mission requirements.

The master plan proposes to concentrate initial growth (CRL and the 10-year growth agenda) in the core of the campus from the land immediately north of Horn Rapids Road to Battelle Boulevard on the south in order to increase campus density, with the majority of other future growth south of Battelle Boulevard. This increased density will concentrate a critical mass of the campus population necessary to support added common-use support spaces, and will place buildings in close proximity to one another to promote pedestrian circulation.

The master plan recognizes an existing land-use pattern and proposes to strengthen it in the development of the campus to strategically locate programmatic components of the growth. Six planning sectors are identified, as follows.

- "Big Science" sector north of Horn Rapids Road defined for larger federal laboratory facilities.
- "Campus Core" sector between Horn Rapids Road and Battelle Boulevard north-south, and George Washington Way and Stevens Road east-west defined for general, non-radiological science facilities.
- "Transitional" sector south of Battelle Boulevard defined to combine further growth of general science facilities and joint programs with the Tri-Cities Science and Technology Park further south.
- "Flex" sector/Port of Benton east of George Washington Way defined as leased buildings for office and research use.
- "Community Interface" sector immediately south of the Battelle-owned property labeled transitional defined for private development of general science and office facilities.

- "Waterfront/Mixed Use" sector between the Flex sector on the west and the Columbia River on the east defined for residential and commercial use.

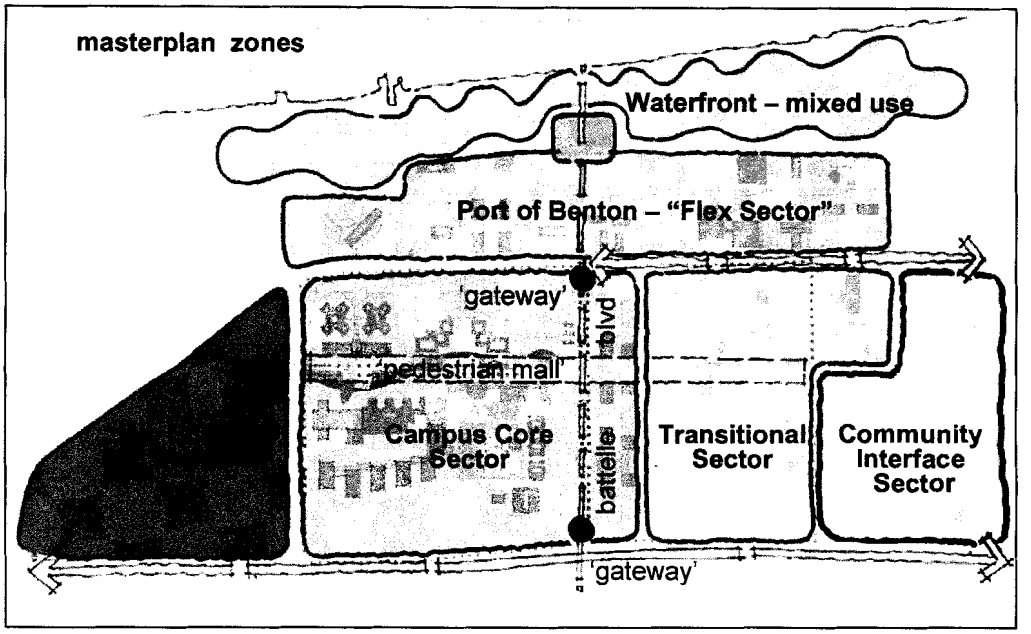


Figure 1.1.a – *Master Plan Zones* (also ***Figure 4.1a***, from Section 4.1)

This master plan zoning allows growth toward and together with the Tri-Cities Science and Technology Park and Washington State University (WSU) and reinforces PNNL's relationship with the City of Richland community and in collaboration with these Tri-Cities groups.

A future organizing element of the master plan is two open-space pedestrian "green zones" to connect the various campus sectors. A primary green zone will replace a portion of the existing Q Avenue, connecting the Big Science, Campus Core, Transitional and Community Interface sectors, and a secondary green zone along Battelle Boulevard will become a central axis for the campus connecting the Campus Core sector with the Waterfront/Mixed Use sector. These green zones act as a framework for building placement, and campus common-use space, and promote pedestrian circulation that together gives the campus a "heart" that is missing today. Distribution of the CRL program among three new facilities, based upon this campus zoning and affinities with existing technical capabilities, will be a catalyst to establishing this campus heart:

- A Physical Science Facility (PSF) located in the Big Science sector with entry on axis with the open space pedestrian green zone along the Q Avenue.

- A Biological Science Facility (BSF), located southwest of the existing Environmental Molecular Sciences Laboratory (EMSL) facility in the center of the Campus Core sector.

- A Computational Science Facility (CSF) also located southwest of EMSL in the center of the Campus Core sector.

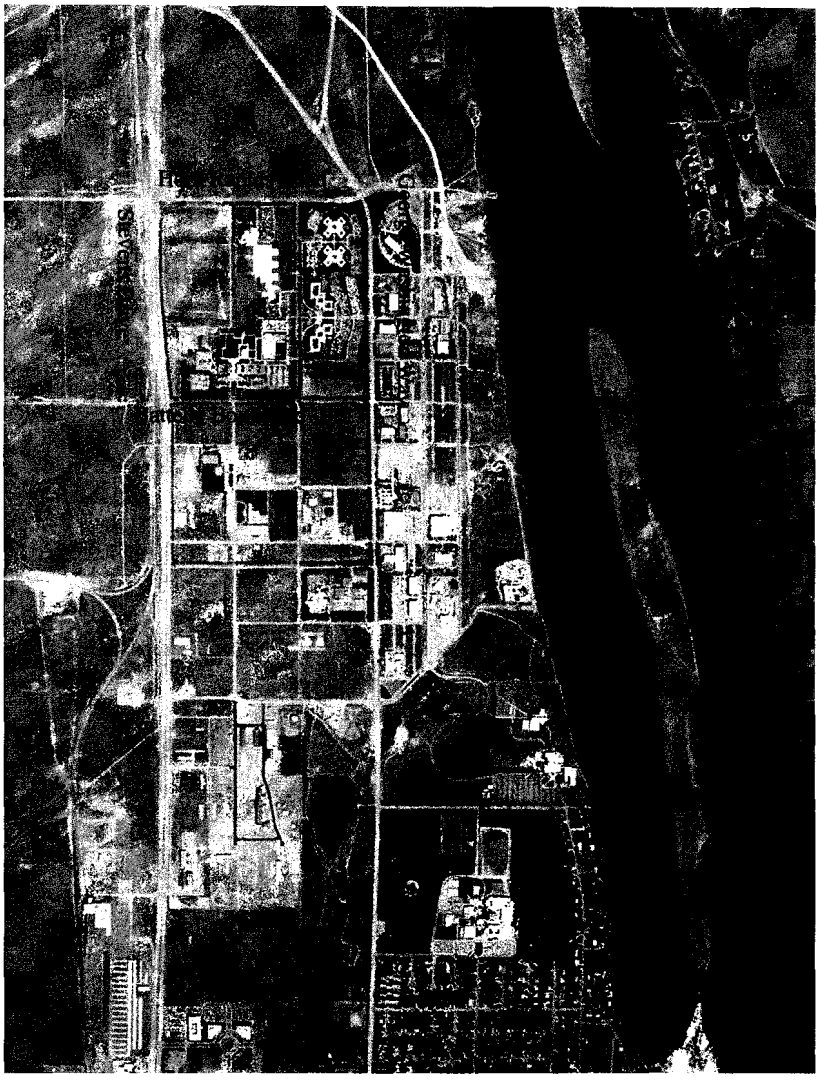


Figure 1.1.b *– Aerial view of Battelle/PNNL property*

Continued development of the Campus Core and Big Science sectors would further strengthen the heart of the campus. The more researchers that can be located within the Campus Core sector or within close proximity, the greater and more dynamic the collaboration and connectivity that will occur around the common-use spaces that bring people together. It is envisioned that such new space in the core of the campus may accommodate some of the researchers and other PNNL personnel currently housed in leased space in the Flex sector. This strategy may be cost-effective in the long term, although maintaining the Flex sector to modulate short-term growth is an important aspect of PNNL's real estate strategy.

In addition, the CRL buildings are expected to incorporate revised space configurations that result in reduced office sizes and improved space utilization. This concept should be incorporated into the existing buildings to the extent practicable.

The move toward a pedestrian-oriented campus will not only accomplish goals of integration and connectivity, but also support development of an enhanced site security strategy. PNNL recognizes the need for increased security, but desires to maintain the openness and amiable nature of the existing campus. The master plan promotes a phased implementation of security measures that respects the pedestrian nature of the campus and can increase security in a way that is transparent. These strategies include moving parking to the perimeter of the campus, and creating a secure perimeter primarily through landscaping and a partial closure of Q Avenue, allowing only service vehicles within the Campus Core sector.

This master plan allows PNNL to realize its vision of an integrated, best-in-class campus while accommodating significant growth. It also leverages the CRL project for maximum positive impact on the campus as a whole.

1.2
Purpose and Goals

Overview

The purpose of this master plan is to provide a framework in which the PNNL Richland campus can realize its vision of an integrated campus that is the best in its class. This, with other planning principles, provides a guide for development that allows substantial growth while accomplishing this vision.

Through a vision session, PNNL stakeholders developed goals for the campus that will become a consensus-based benchmark for decision making for the master plan and its execution. The goals established for the master plan are as follows:

- Creating a heart to the campus – fostering interaction, collaboration and connectivity
- Making the campus more dynamic and pedestrian-oriented, increasing interaction and collaboration
- Enhancing circulation – separating people and material flow, and improving safety
- Increasing security in a transparent way that maintains the amiable nature of the existing campus
- Increasing environmental stewardship by promoting sustainable design.

Process

The primary points of contact at PNNL were the CRL Project Office, Facilities and Operations (F&O) staff, Capability Leads, the Pacific Northwest Site Office (PNSO) Federal Project Director, and the PNNL Leadership Team.

The interactive design process began with a vision session with key representatives from the CRL Project Office, the Capability Leads, and representatives from PNSO (see ***Figure 1.2.1***). The vision session established underlying principles for the master plan and provided a basis for the development of the site response that is incorporated into the master plan.

Figure 1.2.1*, Vision session, January 6, 2005*

A separate session was held to establish specific goals and strategies for sustainable design with design consultants, representatives from the CRL project office, and PNNL's Energy Science and Technology Directorate, as well as PNNL's Facility, Operations & Engineering Division.

The process was integrated with development of the CRL and included nine onsite multi-day workshops to gather information, tour existing facilities, and meet with project stakeholders at PNNL. The master planning team worked with PNNL's operations, space and technical leaders, including representatives from the Environment, Safety, Health and Quality (ESH&Q) Directorate, security, material handling, building support, and campus architects and engineers to establish and review design criteria to be used as a basis for the master plan.

The master plan process was intended to capture the needs of the PNNL campus and to provide leadership in determining land use patterns of the immediate surrounding community. The master planning team and members of the CRL project office met with representatives of the Tri-Cities Science and Technology Park, WSU, and the City of Richland to review and discuss all aspects of the elements contained in this report.

In the development of the master plan, the following key assumption has been made:

- The development of the concept is based upon multiple government sponsors sharing in funding the multiple buildings to allow the most synergistic grouping of technical capabilities. Though the PNNL campus is, and will continue to be, composed of both federally-owned and privately-owned property, the proposed new buildings have been conceptually developed based upon common programmatic affinities and campus zoning without regard to property ownership or funding source.

4.0
Planning Principles: Introduction

This *Campus Master Plan Update* is based on fundamental planning principles that will have a positive impact on the campus and the surrounding community. The categories and highlights of each of the principles are listed here.

Master Plan Campus Zoning *(Section 4.1)*	• Utilize existing campus fabric • Develop forward-looking land-use pattern • Accommodate future growth • Create "gateway" to PNNL campus • Centralize staff
Community & Regional Relationships *(Section 4.2)*	• Collaborate with regional planning efforts • Coordinate planning of contiguous development
Open Space *(Section 4.3)*	• Create a PNNL pedestrian mall • Increase opportunities for campus interaction • Create exciting outdoor environments
Circulation/Traffic *(Section 4.4)*	• Promote a pedestrian-friendly campus • Define clear entries to the PNNL campus
Site Security *(Section 4.5)*	• Present a soft barrier to the community • Establish a clear campus perimeter
Parking *(Section 4.6)*	• Provide parking at campus perimeter • Make parking walkable to facilities
Common-Use Space *(Section 4.7)*	• Foster campus-wide interaction • Increase employee services
Service Circulation *(Section 4.8)*	• Develop campus-wide strategy • Encourage common shared service locations
Site Sustainability *(Section 4.9)*	• Promote stewardship • Showcase leading-edge technologies
Site Thermal Utilities Distribution *(Section 4.10)*	• Develop efficient distribution corridors • Promote regionalized CUP concept
Development Potential *(Section 4.11)*	• Develop campus strengths to advantage • Create a heart for the PNNL campus • Establish and promote capability adjacencies

4.1
Master Plan Campus Zoning

Planning Principles for Master Plan Campus Zoning

- Utilize existing campus fabric
- Develop forward-looking land-use pattern
- Accommodate future growth
- Create "gateway" to PNNL campus
- Centralize staff

Organizing the PNNL campus and its surroundings began by assessing the existing campus fabric and identifying appropriate land-use zones for future growth. Creating these identifiable zones both characterizes the areas for new development and gives an identity and organization to the existing facilities and proposed campus master plan.

To determine where the major programmatic components should be most appropriately located on campus, several conceptual land-use pattern diagram options were developed for the PNNL campus. These conceptual diagrams were developed during the "discovery" phase of the site analysis process, which identified the site opportunities and constraints for the existing campus structure/fabric. This site analysis process links the program and the concept for campus planning and design.

Figure 4.1a identifies the agreed-upon organization of the three major PNNL components on the campus. The three major PNNL programmatic elements are: Big Science, Campus Core, and Transitional uses, together with the adjacent community program elements of the Port of Benton (Flex space), Waterfront (Mixed Use), and the Community Interface sector (Flex space).

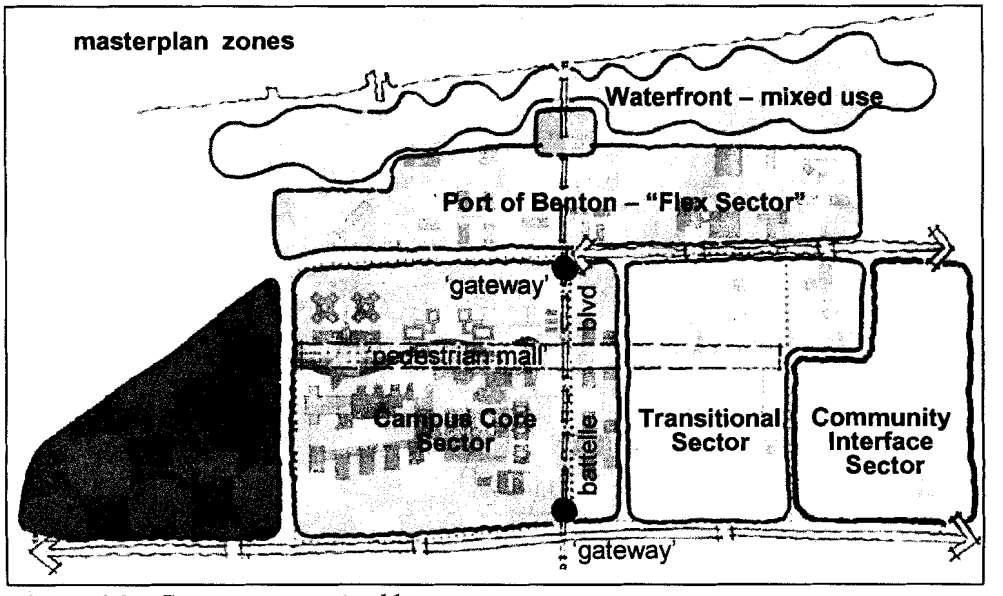


Figure 4.1a–Campus categorized by sector

The Big Science sector is located at the northernmost portion of the PNNL campus within the 100-acre Horn Rapids Road Triangle parcel and is targeted for the CRL PSF facility. The rationales for locating the radiological component of the CRL in this position are the following:

- Northernmost location of PNNL campus and the furthest from the City of Richland, therefore remote from the community
- Use of available DOE-owned land.

The Campus Core sector includes 250 acres of Battelle property and 30 acres of DOE property and is targeted for CRL third party facilities and small federal facilities. The Campus Core sector is located within the approximate center of the PNNL campus for the following reasons:

- Takes advantage of the existing building use and population density
- Increases campus density to create a heart for the campus
- Promotes and enhances the existing scientific synergies and adjacencies

The Transitional sector will be flexible non-radiological research and development laboratories and office spaces with support facilities such as central shipping and receiving, warehouse, maintenance facilities, and general support space. The Transitional sector is located at the most southern portion of the PNNL campus for the following reasons:

- Supports additional general non-radiological science growth
- Provides transition to adjacent lower density community development
- Provides additional common-use space facilities and overall centralized campus support facilities, such as Receiving Shop, Machine Shop, etc.

The three sectors that comprise the primary PNNL campus will be connected by the creation of the formal open-space pedestrian mall that will unify the Campus Core sector and provide the major connection between the Big Science, Campus Core, and Transitional sectors. Campus gateways at the intersections of George Washington Way and Stevens Drive with Battelle Boulevard are proposed in order to create the entry image for the PNNL campus at the vehicular scale and to provide the public with an identifiable entry point to the PNNL campus.

The Flex sector currently comprises office and research and development space leased by PNNL from private developers on private land, as well as land leased from the Port of Benton. This provides PNNL with real estate flexibility and opportunities for growth and contraction with minimal capital investment and schedule implications.

The Waterfront/Mixed Use sector is currently an area where several private developers are proposing projects that include residential, retail, and commercialization space to activate the North Richland area. These types of projects are being encouraged and supported by the City of Richland and by the adjacent land owners such as WSU and the Tri-Cities Science and Technology Park. These types of uses will serve to enrich and diversify the space types currently within this area and create a community for living, working, and recreation.

The Community Interface sector is similar in use to the Flex sector, but here the property is owned by private developers and is envisioned to provide PNNL and others (City of Richland, WSU, and private developers) with real estate flexibility and opportunities for growth and contraction, with minimal capital investment and schedule implications.

The PNNL campus builds upon the previous zone diagram and is organized into three major components: building, parking, and green zones. The campus organization is based upon the order and structure of the open space and circulation system, both vehicular and pedestrian, and also upon connection to the adjacent community land use. ***Figure 4.1.b***. depicts the site organization and layers of open space zones, building zones, and parking zones.

The constraints for development within the PNNL campus are minimal; therefore, the development potential is based upon the goal and vision of creating a heart for the campus that will serve to connect and foster collaboration and communication among the members of the research community.

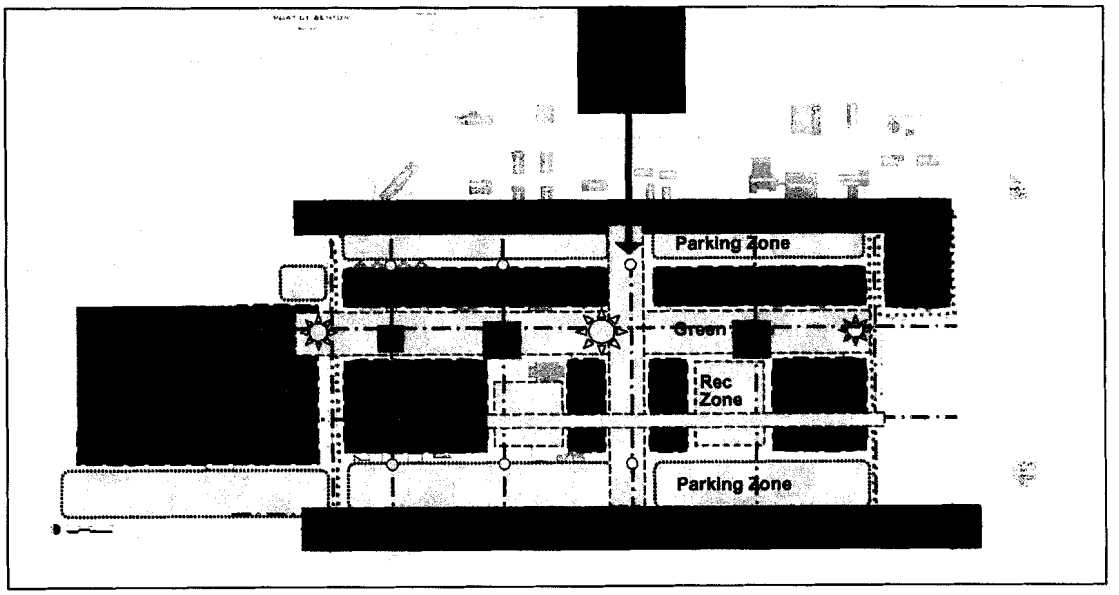


Figure 4.1.b – *This figure outlines the PNNL site organization.*

4.2
Community and Regional Relationships

Planning Principles for Community and Regional Relationships	• Collaborate with regional planning efforts • Coordinate planning of contiguous development

PNNL is located near the west bank of the Columbia River at the northern boundary of the City of Richland, Washington. The existing PNNL campus currently consists of approximately 600 acres, which includes the U.S. government/DOE property ownership of 350 acres and Battelle property ownership of 250 acres available for future private or public development.

As seen in ***Figure 4.2.a*** below, land immediately west of Stevens Drive is owned by the Port of Benton and includes the planned industrial development within the Tri-Cities Science and Technology Park–West Campus. Land to the east of George Washington Way is predominantly owned by the Port of Benton within the Tri-Cities Science and Technology Park–East Campus, and includes the Tri-Cities campus of WSU. Future planned development within the Tri-Cities Science and Technology Park, such as the "River Walk" project, will serve to infuse retail and residential activity into this sector of the community and provide amenities for the employees within PNNL and the Tri-Cities Science and Technology Park.

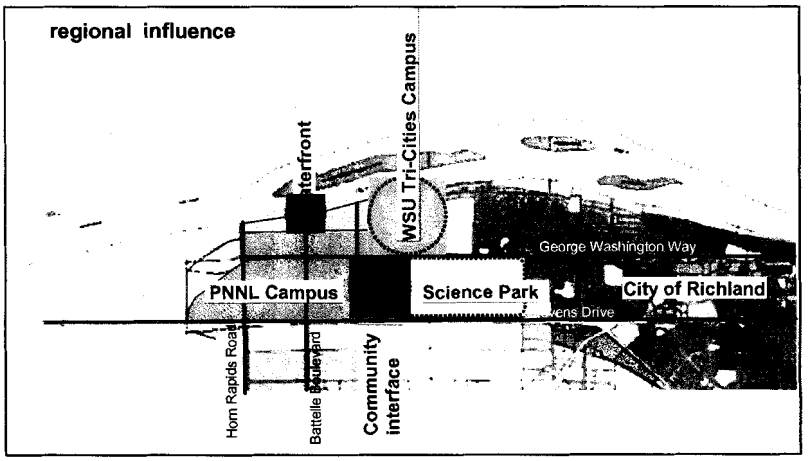


Figure 4.2.a – *Regional influence*

The area designated as Community Interface in ***Figure 4.2.a*** offers an opportunity to further create a sense of place and community for the employees within this sector of the community. These common amenities will provide a link between the PNNL campus and the Tri-Cities Science and Technology Park communities, which includes the WSU community along with the City of Richland community, both commercial and residential. This Community Interface zone offers opportunities to accommodate growth south of the PNNL campus, and can serve to establish a sense of community for this sector of Richland through the use of a standard site development and architectural design vocabulary established for the PNNL campus.

Meetings with local community officials, both public and private, have taken place to gather data on future planning initiatives and issues that may impact the development of the PNNL *Campus Master Plan Update*. PNNL provided general information regarding the future planning of the PNNL campus and solicited input from the community officials. All discussions were preliminary in nature and were for information only, with no decision or direction requested on any issue.

4.5
Site Security

Planning Principles for Security

- Present a soft barrier to the community
- Establish clear campus perimeter

The existing security paradigm for the PNNL campus provides open, unchecked access to the PNNL campus for pedestrians and vehicles, with the entry control point at each specific building entry for employees and visitors, and layers of security within each building to control access to special clearance spaces. The security of intellectual and physical property at the PNNL campus has been enforced within buildings. This current building-by-building strategy has minimized the need for perimeter security fences or other site control systems.

The existing campus organization and structure for employee and visitor parking and service vehicles has allowed for minimal stand-off distance between the buildings and the vehicles and/or pedestrians. There are multiple vehicular and pedestrian conflicts and crossovers, and a singular service and parking strategy for the campus has not been developed.

Since the September 11, 2001, terrorist events, the security of DOE facilities and protecting the employees and visitors on campus has become more of a concern. To address this need, PNNL's first step has been the preparation of a report titled *Recommended Security Requirements for New Facilities-Security Design Criteria (SDC)*. This SDC addresses security parameters for both campus planning and the design of new buildings and engineering systems to enhance security.

The SDC outlines the general security strategies and levels of protection. The three levels of protection are low, medium, and high levels of protection. A risk and threat assessment for the campus has been completed by PNNL and it has been determined that this campus has been classified as a "low" threat.

The *Campus Master Plan* team met with PNNL's Site Security personnel to set a direction for the security paradigm for the campus based on the SDC. The following recommendations are based on establishing rings of security layering, while maintaining an open, pedestrian-oriented campus:

1. The campus will operate at a "low" level security requirement, but will be designed to accommodate a "medium" level security requirement.

2. Parking will be located outside the secure perimeter.

3. The secure perimeter will have the look and feel of a soft barrier, but will stop the proper vehicles. Service vehicles will be separated from pedestrian and employee vehicles wherever possible. The definition of a soft barrier is a barrier that blends into the landscape and does not have the imagery of a fortress; for example, a soft barrier would not include a barbed-wire, chain-link fence. See ***Figure 4.5.f.***

4. The secure perimeter could be implemented in a phased approach. The initial phase would control vehicles at the perimeter of the building with a specific stand-off distance to meet the required level of security; the second phase of security implementation would install manned entry control points at the required secured perimeter to check all pedestrians entering the PNNL campus, both employees and visitors.

5. There will be the ability to provide hard security in the future, if needed, based on the changing security environment.

Figure 4.5.a represents a comprehensive approach of controlling the entire perimeter of the PNNL campus for the initial phase of development/growth. As discussed, this can be scaled back to address vehicular control only, while providing pedestrian portals into the campus at the entry approach to enhance and enrich the pedestrian experience from parking to workplace.

The planned future development south of Battelle Boulevard can be secured using a similar concept of layering.

The Flex sector security paradigm will need to be tailored to meet each specific use within each building since these are leased facilities. Agreements need to be reached between the landlord and PNNL regarding the level of security improvements. This building-by-building strategy has minimized the need for perimeter security fences or other site control systems such as vehicular gatehouses.

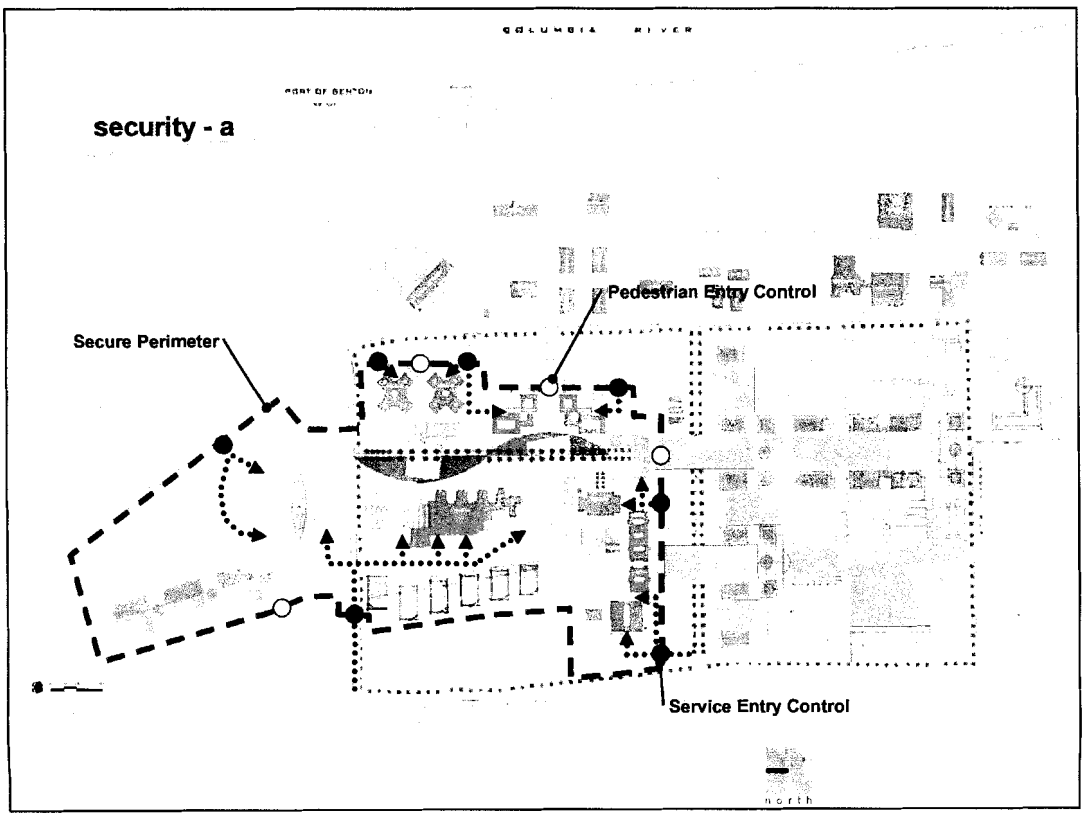


Figure 4.5.a – *Site security diagram*

Figure 4.5.b represents the same security approach of controlling the entire perimeter, but it allows for Horn Rapids Road to remain open as a public road if closure is not adopted by the City of Richland.

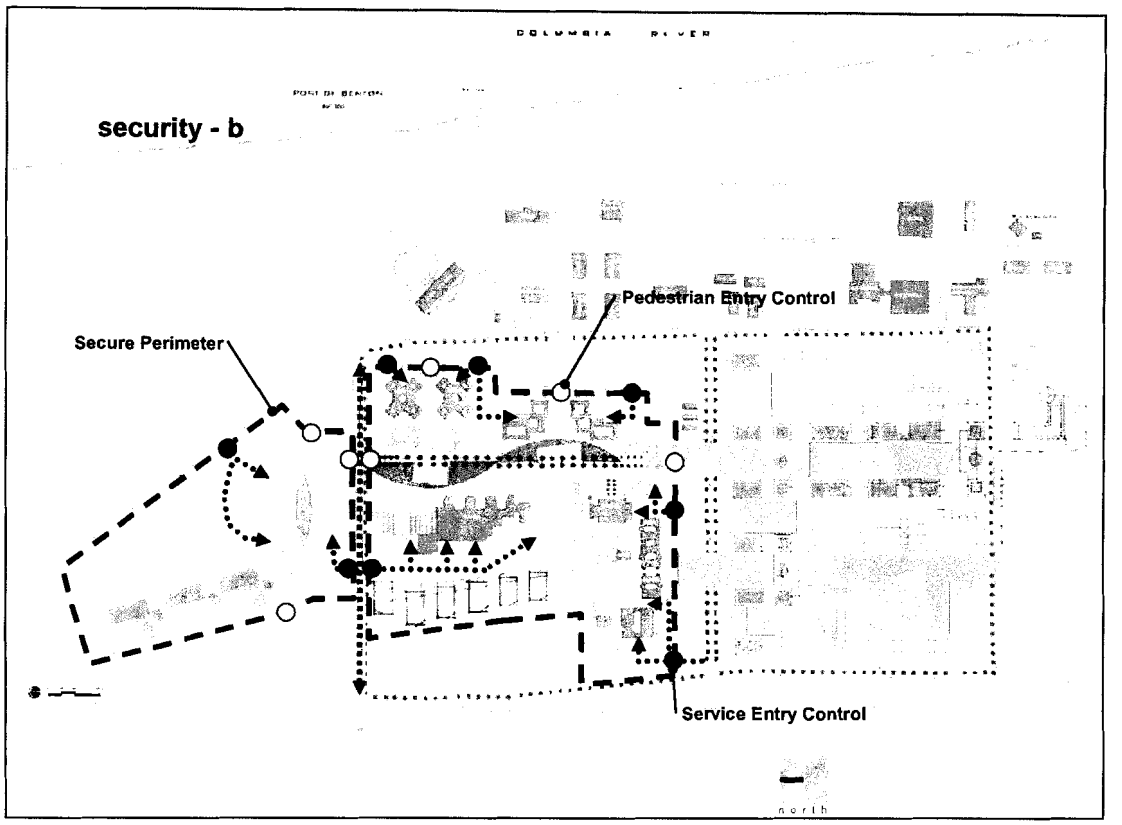


Figure 4.5.b Site security perimeter with Horn Rapids Road remaining open

Control points would be located at public entries to control service vehicles. Positioning these control points to access multiple buildings would be the goal. For example placing a control point northwest of EMSL contiguous to proposed buildings to the west of EMSL would encircle and group service yards around Einstein Avenue. This arrangement makes it possible to secure facilities fairly easily and inconspicuously. It also accommodates sharing of facilities among research buildings, segregates service traffic from pedestrians and from other vehicular traffic (improving safety for all three), and screens service yards from view.

As outlined in the SDC, the following diagrams graphically articulate several key requirements for the campus master planning effort. The four key requirements are:

- parking stand-off distances from buildings
- service docks, mechanical equipment, and storage accommodation
- building separation
- vehicular barriers.

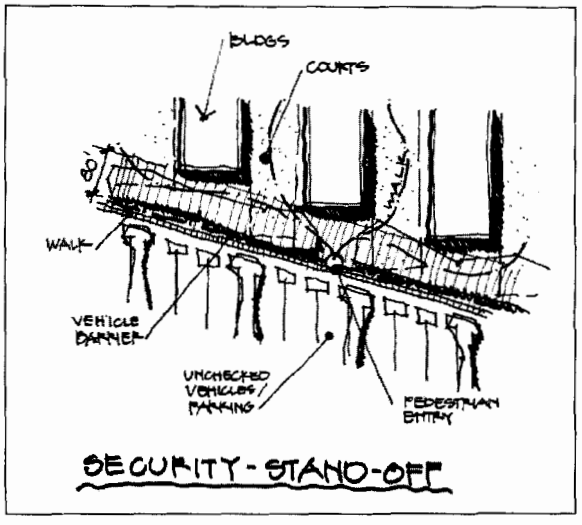


Figure 4.5.c shows the SDC-required stand-off distance between parking and buildings for a medium level of security. This requirement is a stand-off distance of 80 feet from building to unchecked vehicles.

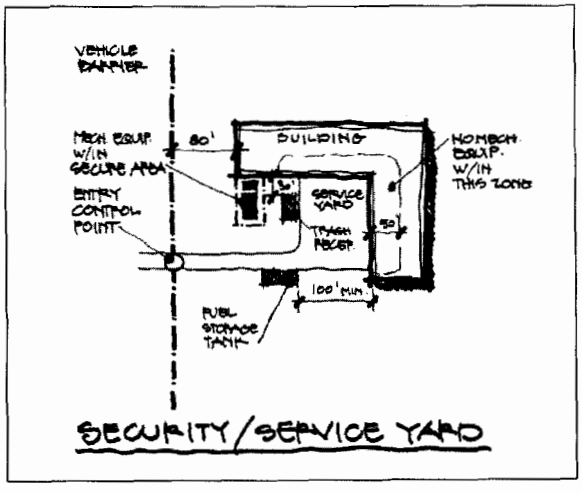


Figure 4.5.d delineates the SDC required stand-off distance between the building and mechanical equipment and utilitarian service-type equipment. The entry control points can restrict access to each service area by utilizing gates and fencing or pop-up security bollards or wedges. An additional way to monitor vehicles entering the campus would be to utilize the developing technology of radiofrequency identification tags (RFID tags).

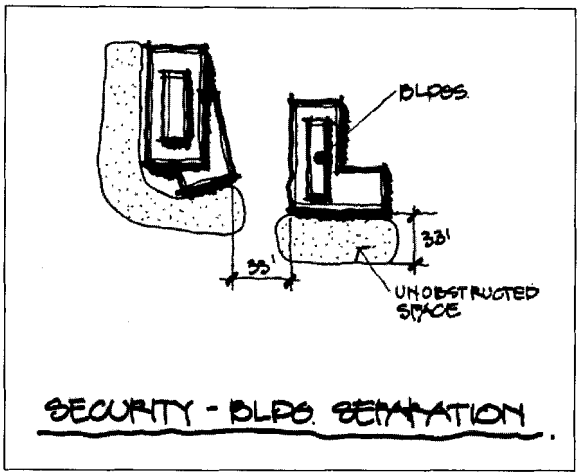


Figure 4.5.e establishes the SDC required separation between buildings within the security perimeter.

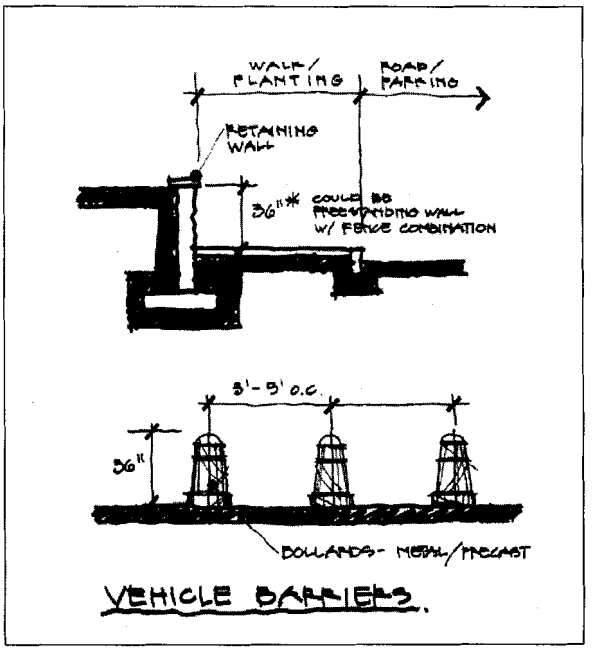


Figure 4.5.f outlines various methods to provide the soft barrier at the secure perimeter. The various methods can be bollards, street furniture such as benches, light fixtures, trash receptacles, planters, and retaining walls or freestanding walls a minimum of 36 inches high. See the SDC for additional specifications regarding site security barriers, as well as for the architectural and engineering criteria.

4.6
Parking

Planning Principles for Parking

- Provide parking at campus perimeter
- Make parking distance efficient to facilities

Parking is the largest single use of land on the PNNL campus. Walking distance, travel time, and pedestrian safety are critical drivers that must be balanced with parking convenience and the capacity of the campus to accommodate present and future parking demands. In addition to the above-stated drivers, the PNNL campus must consider the new SDC to include stand-off distances, access control of service vehicles and, if merited due to a required increased level of protection, pedestrian access control. (See Section 4.5, Site Security.)

The first task was to understand the use and facility population of each of the buildings, as notated in ***Figure 4.6.a.*** This analysis considered both PNNL-owned and leased facilities and EMSL, a DOE facility. Using this, the team could understand the campus land-use pattern, and determine whether there were any functional adjacencies between the existing users that must be maintained, or if they could be better located in different campus sectors for improved collaboration.

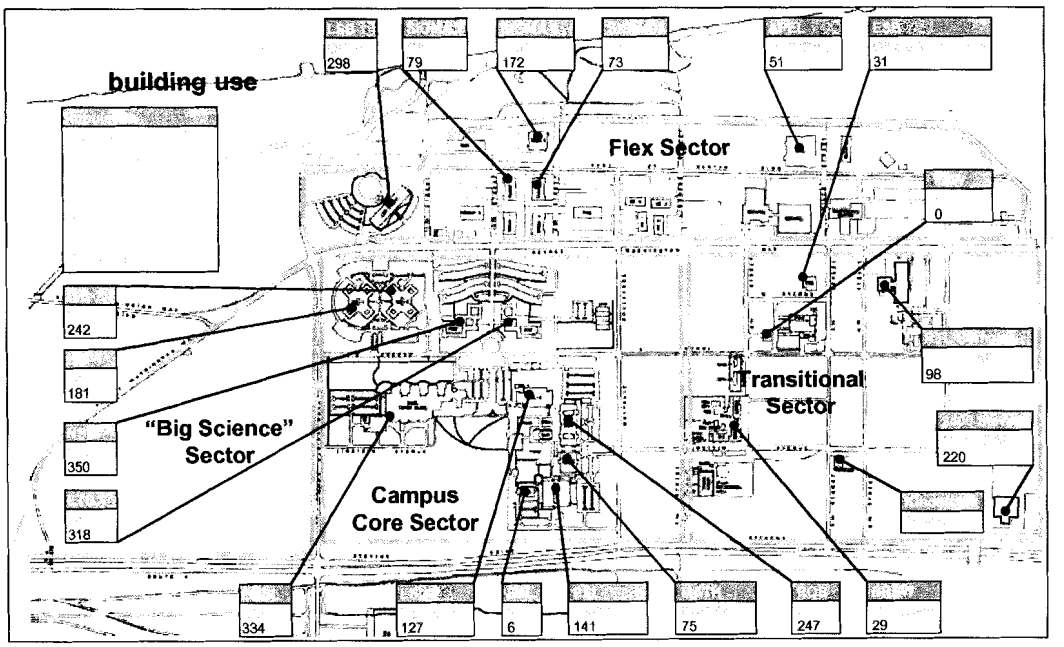


Figure 4.6.a *– Building use and estimated population*

The design team's next task was to understand the parking distribution and parking space numbers relative to the employee population (see ***Figure 4.6.b)***. Currently, the number of parking spaces within the Campus Core sector exceeds the number of employees. Therefore, there is good proximity between an

individual's office and that person's parking space. Depending on future campus growth, the convenience of having a particular individual's parking space close to his/her office/lab may be diminished from today's standard. The master plan goal is to have most people within a one- to four- minute walk or a 100- to 800-foot walking distance from their parked vehicle to the front door (see ***Figure 4.6.b***). This walking sequence is an important entry experience that must have the same level of quality of landscape development as do the major open spaces within the campus. There may be an opportunity for the sharing of parking spaces among facilities and users, depending on future campus growth.

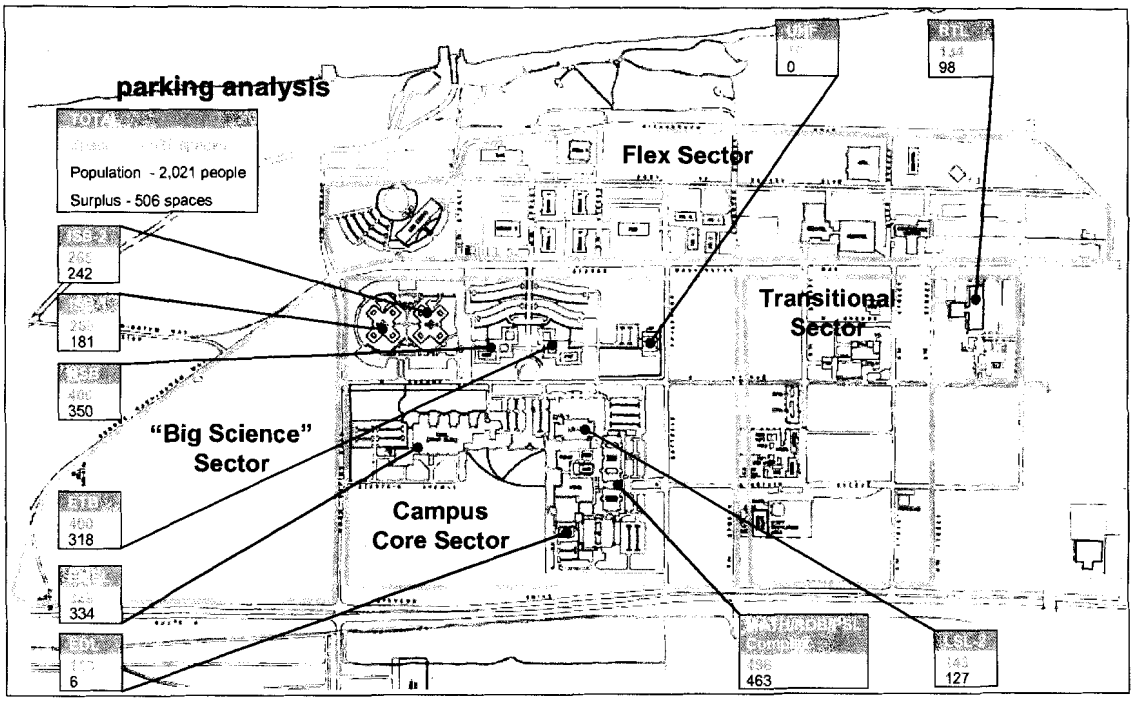


Figure 4.6.b – *Employee/parking distribution*

The proposed position of the parking on the perimeter of the site allows for the potential of creating and making the PNNL campus more pedestrian friendly by creating large expanses of continuous green space within the campus in lieu of surface parking. It also minimizes potential conflicts between pedestrians and vehicles by reducing crossing points of these two distinct systems, thereby creating a safer environment at the pedestrian level. Locating the parking on the perimeter allows for the site security measures to be implemented as discussed in Section 4.5, Site Security. The proposed positioning of the new surface parking facilities on the perimeter will be coordinated with the phased design of the planned new buildings and the subsequent demand for parking.

Existing parking that will be displaced internal to the site due to the partial closure of Q Avenue will be accommodated within the proposed future perimeter parking facilities. Specific motor courts should be developed at facilities such as EMSL where this type of function is required to accommodate visiting dignitaries and special events. Limited and special access will be permitted to these vehicular entry drop-off functions for special proceedings and visiting dignitaries. Access to these proposed motor courts will

be via fire lane and pedestrian mall hardscape, which will perform a dual function by allowing permitted vehicles to access these motor courts. Motor courts will also double as pedestrian gathering spaces when not utilized for these special events.

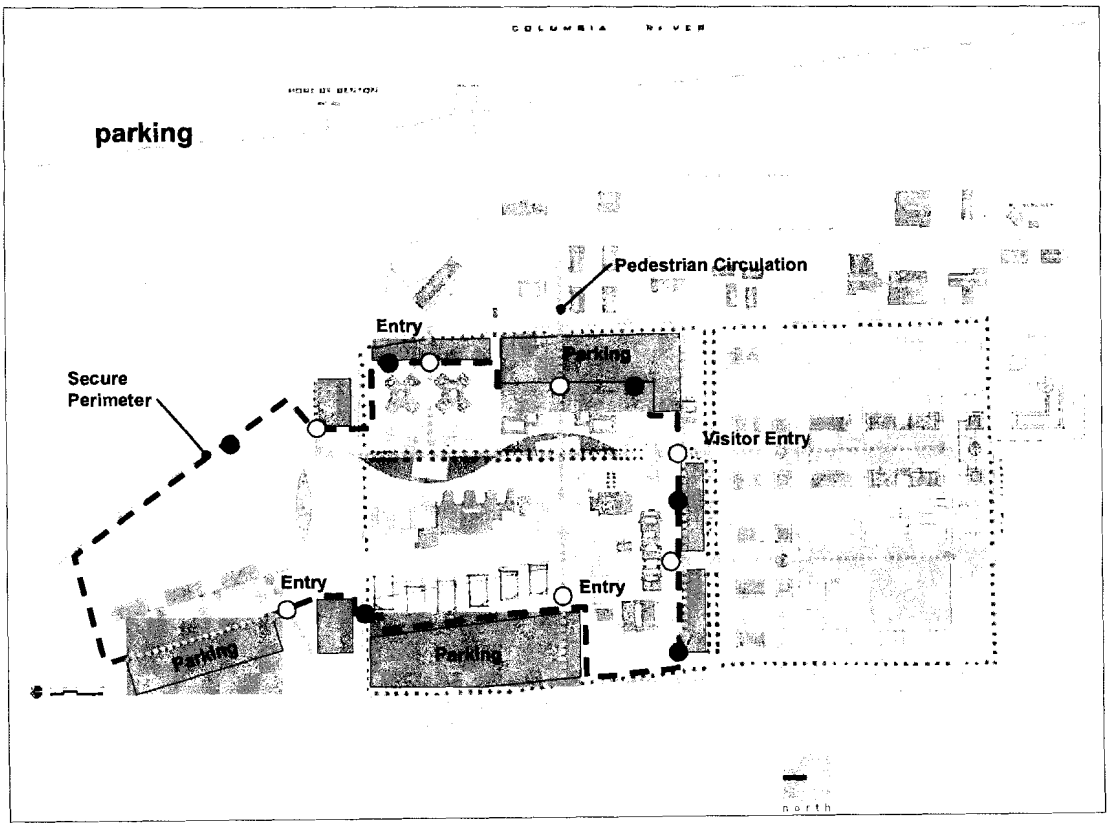


Figure 4.6c *– Site perimeter parking distribution diagram*

The following diagram, ***Figure 4.6.d,*** articulates several key drivers for parking areas on the PNNL campus. These include the need to:

- Address the scale of parking facilities at the pedestrian level
- Add the appropriate level of landscape development to the parking areas
- Provide a safe and environmentally friendly parking facility
- Provide the required security measure.

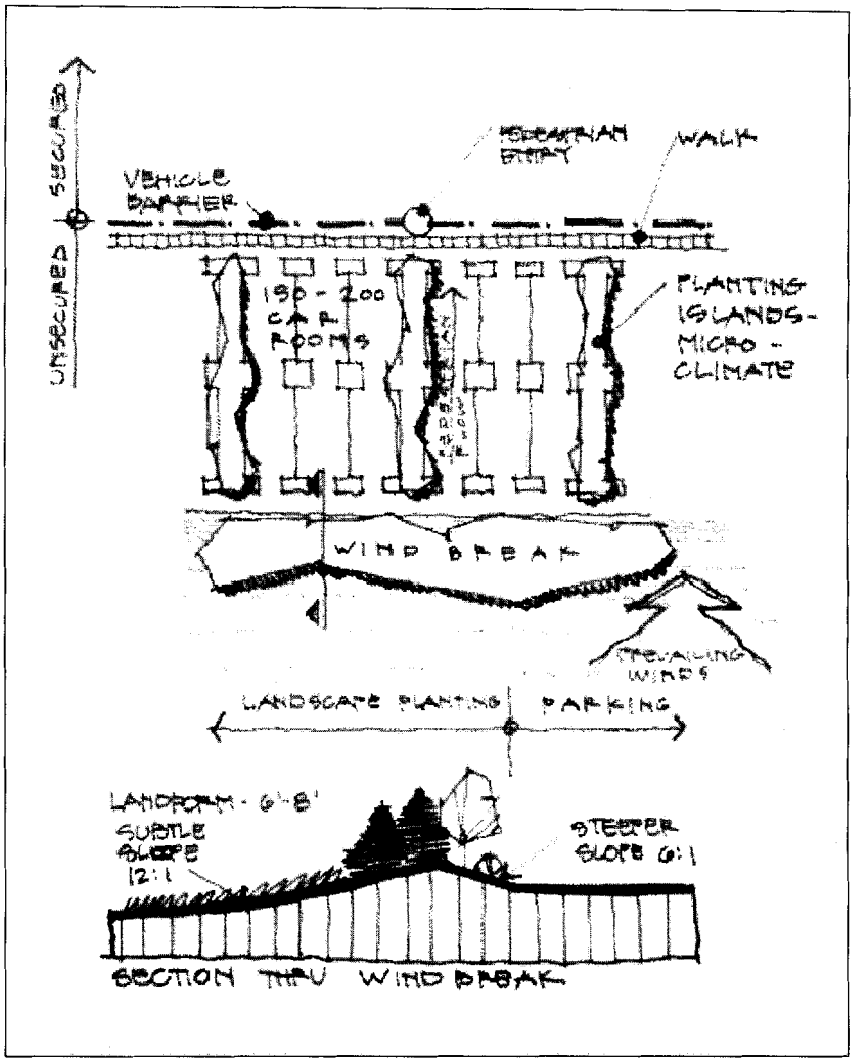


Figure 4.6d *– Parking "room" diagram*

The stated objective from the 2002 *Campus Master Plan* of preserving the opportunity to construct a secondary street grid over the rest of the campus is still valid. The purpose of this objective is to promote efficient circulation with limited dependence on busy intersections as the campus becomes more populous. Following the recommendations of earlier master plans, the current master plan must respect the alignments of east-west streets from 3rd Street through 11th Street. This will preserve the opportunity to establish a grid of secondary streets within the campus as the need for them arises. Furthermore, the

grid is coordinated with street alignments on the east side of George Washington Way, so that four-way intersections can be constructed if and when they are needed.

This *Campus Master Plan Update* has not anticipated the development of any parking structures on the PNNL campus, due to the availability of sufficient real estate/land to accommodate surface parking in the proper locations to support the campus master plan.

4.9
Sustainability

Planning Principles for Site Sustainability

- Promote stewardship
- Showcase leading-edge technologies

One of the main sustainability design goals for PNNL is to use the campus and its facilities as a leading showcase for sustainable design technologies. PNNL recognizes its role in promoting environmental stewardship and is committed to looking at every viable alternative. The design team, working with representatives from PNNL through a series of workshops, identified a number of sustainable systems, strategies, and products which can be employed by PNNL.

Sustainable Site Development Guidelines

The following sustainable site development guidelines have been prepared to support and guide the PNNL master planning effort. These guidelines are proposed to assist the designers in complying with the PNNL Project Design Criteria, including Leadership in Energy and Environmental Design, or LEED® Certification requirements. While the sustainable design goals are driven by specific design criteria discussed in the following pages, their primary goal is to reduce environmental impact, which starts right from the time that the ground is broken. The intent is that these guidelines be adopted for all new construction on the PNNL campus.

A. Design Criteria

The following resources were used to develop the sustainable site design goals identified in this document:

1. LEED-NC version 2.1: In addition to the LEED® rating system, the project is also committed to following the Labs21 Environmental Performance Criteria (EPC) for promoting sustainable design strategies specific to the unique requirements of a typical laboratory building.
2. PNNL Sustainable Design Criteria also call for addressing the following Federal Executive Orders:
    - Executive Order 13123 – Greening the Government through Efficient Energy Management. See http://www.ofee.gov/eo/eo13123.pdf for details.
    - Executive Order 13148 – Greening the Government through Leadership in Environmental Management. See http://ceq.eh.doe.gov/nepa/regs/eos/eo13148.html for details.
    - Executive Order 13101 – Greening the Government through Waste Prevention, Recycling and Federal Acquisition. See http://www.epa.gov/oppt/epp/pubs/13101.pdf for details.

3. Other applicable resources include:
    - 10 CFR 435 – Mandatory Federal Energy Efficiency Requirements at http://www.wbdg.org/pdfs/10cfr435.pdf
    - 10 CFR 436 – Life-Cycle Cost Analysis Requirements at http://www.wbdg.org/pdfs/10cfr436.pdf

B. Sustainable Site Guidelines

1. During the construction phase, storm water run-off and sedimentation into the surrounding river area, as well as air pollution due to particulate matter, will be prevented by protecting topsoil from erosion with fast-growing plants or mulching and constructing sedimentation traps.
2. The relationship between the built areas and parking lots will be designed to encourage and promote pedestrian circulation in and around the project site. Buildings will be located as close to public transit stations as possible, and provide easy bike and pedestrian access to encourage public commuting. Built areas with interconnected functions will be clustered together to minimize the need for transportation between facilities. Pedestrian access between buildings will be encouraged by creating pedestrian-friendly connectors that are intimate in scale, shaded, protected from winds, and accentuated by buildings and landscape.
3. The master plan will include parking, storage, and showering facilities to encourage the use of bicycles, when needed. It may also include a provision to support a conveniently located, on-campus bicycle loaner program to share bicycles among all buildings as riders move from one building to the next.
4. Parking requirements will be limited to the code minimum, and include dedicated parking for car/van pools. The master plan development is also considering a circulation and parking design to restrict vehicular parking to the perimeter and provide an opportunity for a "clean-fuel" shuttle service for transportation within the campus.
5. Disturbance due to construction activity will be limited by defining construction site boundaries around the proposed building perimeter, walkways, and utility trenches.
6. A building design will be stacked to achieve the programming and architectural objectives while limiting the building footprint to less than 50 percent of the total site area to maximize open space as well as maximize pervious area for storm water drainage. In addition to encouraging pedestrian movement, clustering buildings together will also help in consolidating large open spaces for creating habitats for animal and plant species that enhance environmental quality in and around the building, and can potentially provide natural pest control.
7. Disruption to natural groundwater reserves and drainage patterns will be minimized. This will be achieved by preserving and enhancing naturally occurring water channels on the site, and reducing hard paved areas by implementing pervious materials or paving designs. Additionally, green roofs will be considered where applicable.
8. In addition, rainwater may be harvested by organizing slopes carefully to drain water to one or two rainwater collectors. Landscape elements such as ditches or dikes and filtration strategies using vegetation will be included to treat storm water for reuse.

9. Heat-absorbing site surfaces will be minimized using light-colored materials for roofs and hard paved areas, or introducing roof gardens. This will reduce overall site micro-climate temperatures during summer months, when peak cooling loads occur. In addition to surface color, introducing site vegetation (preferably low-maintenance native species) will also lower micro-climate temperatures through evapo-transpiration without significantly increasing water-use. While roof gardens reduce storm water run-off, hard roof surfaces open up an opportunity for installing a relatively low-cost photovoltaic sheet on the roof surface.
10. Outdoor lighting design will be restricted to meet safety, security, egress and identification issues, and not be used for merely decorative purposes. "Full cut-off" luminaries or other adequately shielded lighting design will be used to reduce light pollution. Energy-efficient fixtures and automatic lighting controls may be implemented.
11. A building will be oriented to promote energy efficiency by allowing easy access to daylight and solar control. Typically, short overhangs are adequate to provide optimal control for the relatively high solar altitude on the south, while the north has almost no direct solar exposure, making these the ideal orientations for locating windows. Thus, a primarily east-west axis for the building will maximize the potential for daylight utilization and renewable energy system integration (building-integrated photovoltaic system). Integrating the landscape design to shade lower wall areas around the building will also reduce energy consumption.
12. Native and adaptive vegetation will be used for landscaping to reduce any additional water consumption beyond the initial three-year establishment period. Low-water irrigation systems may be installed for the establishment period only. The preference for site vegetation is native species that will use evapo-transpiration to lower microclimate temperatures.

4.11
Development Potential

Planning Principles for Development Potential

- Develop campus strengths to advantage
- Create a heart for the PNNL campus
- Establish and promote capability adjacencies

The existing 600-acre site (350 acres, DOE owned, 250 acres, Battelle owned) offers many opportunities for development across the existing PNNL campus. The land-use pattern created by the existing streets that are lined with mature sycamore trees gives the PNNL campus a strong order and image. The existing sycamore trees need to remain as the major image giver for the PNNL campus and must be considered a site amenity within any future plan for developing the campus. To enable the Horn Rapids Road Triangle property to be viewed and integrated into the PNNL campus both visually and physically, the concept of lining the streets with sycamore trees on the PNNL campus should be applied to the Horn Rapids Road Triangle property, with sycamore trees being placed at the perimeter of the Horn Rapids Road Triangle site. The portions of roads bounding the Horn Rapids Road Triangle property are Stevens Drive, George Washington Way, and the north edge of Horn Rapids Road. These should be planted with sycamore trees or a tree similar in structure, form, and texture.

The existing water feature is an underutilized asset on the PNNL campus. This asset needs to be connected to the rest of the PNNL campus. Campus users should be drawn to this space to take advantage of the spatial qualities of this water feature. Site improvements are required to this space to make it a more desirable destination on the campus and more accessible to all the campus users.

There are distant views from the campus to adjacent mountains and the Columbia River that should be considered when developing the exterior spaces across the campus.

The existing roadway infrastructure appears able to accommodate the growth potential for the site, with associated improvements at milestones or specific phases of development based on level-of-service capacities for the surrounding roadway network.

The existing zoning and land-use regulations do not pose any restrictions for the development and growth of the PNNL campus. In fact, they are compatible with the anticipated uses for the campus. Within the community, the PNNL campus is viewed as an asset, and the campus leadership has built favorable relationships with governmental and community officials.

With 600 acres of land available for future development, the quantity of land will not be a limiting factor for PNNL's future growth. The potential development of the PNNL campus should meet facility growth needs for the next 20 years and beyond.

Through the design team's site analysis, it was discovered that there are minimal site constraints that would limit the future development of the PNNL campus. One site driver for the development of the PNNL campus is the issue of property ownership. Currently, there is both federally and privately owned land within the PNNL campus. Typically, federal development/facilities are located on federal land, and

private development/facilities are located on private land. However, private development/facilities could occur on federal land, or federal development/facilities could occur on private land. It is, however, a lengthy process to structure the legal agreements and obtain all the required approvals.

The future development of the Transitional sector south of Battelle Boulevard should utilize the same design vocabulary as the Campus Core sector. The Transitional sector should engage an extension of the pedestrian mall from the Campus Core sector to link the two sectors together visually and physically. The same planning principles that were outlined in the previous sections should be applied to the Transitional sector for open space development, parking, circulation/traffic and service strategies, site security, and site infrastructure/utilities.

5.1
Zoning/Land-Use Restrictions/Access

A. Planning Context

The total 600-acre PNNL campus consists of 380 acres situated within the jurisdiction of the City of Richland. The campus is subject to proposed policies under Ordinance No. 4-05 and contained in the *City of Richland Comprehensive Plan*. These proposed policies will be implemented through the City of Richland Zoning Ordinance, Title 23 of the city code. The proposed new code more adequately reflects the current development patterns of the city. The proposed revisions to the code include: updating the zoning code format; providing new procedures to expedite permit review processes; new language granting staff authority to make code interpretations; eliminating redundant or very similar zoning districts; providing a new central business district consistent with the city's Comprehensive Plan land-use designation; and new standards for outdoor lighting, buffers for multifamily and office developments, and building heights.

Proposals and recommendations made in this *Campus Master Plan Update* appear to be entirely consistent with all relevant policies included in the proposed Zoning Ordinance.

B. Land Use and Zoning Regulations

The *City of Richland Comprehensive Plan* designates the entire PNNL campus within the Industrial Zoning District with a Use District classification as Business Research Park. Section 23.26.030 of the Zoning Ordinance regulates these uses within Business Research Park Use District (B-RP). (See ***Figure 5.1.B.a***.) Under this section the following uses, among others, are permitted outright: general or corporate offices; research, development, and testing; and science related research, development, and testing facilities. Other permitted uses include: administrative and office facilities to accommodate professional and technical staff; restaurants with onsite dining; retail and service uses intended to support essential uses; light manufacturing in conjunction with other primary or essential uses; and storage in an enclosed building. The uses allowed by issuance of a special permit by the Planning Commission include extended stay-type lodgings and dormitories; high-density residential uses; and daycare centers and preschools.

The Zoning Ordinance stipulates performance standards requiring that all uses shall be conducted entirely within enclosed buildings; on- and off-site hazardous waste treatment and storage facilities shall be located a minimum of 300 feet from surface water, residential zones, and public gathering places; public pedestrian access around and through a site is encouraged and should include clearly marked travel pathways from the public street through parking areas to primary building entries; development of a trail system through landscaped areas is encouraged and should, where possible, connect to trail systems on adjacent sites; and no more than 10 percent of the total number of acres in the B-RP zone or within a specific business park shall be developed with commercial uses.

Section 23.26.020 of the Zoning Ordinance for minimum building requirements allows that there is no maximum or minimum lot area required for the uses anticipated in the campus master plan. The setback required for a public street is a minimum of 25 feet, and is to be landscaped. Maximum building height shall not exceed 55 feet in a B-RP district with a maximum of 100 feet with special

review and approval. Private communications facilities may exceed the height limitation. At a minimum, at least 30 percent of a site shall be landscaped. Landscaped areas may incorporate pedestrian amenities such as meandering pathways or trails, street furniture such as benches, public art features, or similar features. Fences are not allowed any closer to the street right-of-way than the building setback requirement of 25 feet.

The minimum on-site parking requirement in the Zoning Ordinance is based on one space per 250 square feet of building area for office use. A ten percent reduction in parking spaces is permitted in respect of joint use parking lots. Parking lots are to be paved, lit, dimensioned, and landscaped in conformance with stipulations contained in Sections 23.54.010 through 160. Perimeter landscaping of parking lots is generally required to be at least ten feet wide along public streets and five feet wide along other boundaries. Interior landscaping for lots accommodating ten or more parking spaces is to cover at least five percent of the lot area. See Sections 23.54.140 – 160 for specific planting criteria.

Motorcycle parking is to be provided at the rate of one space per 25 required automobile spaces. A minimum of five bicycle parking spaces is to be provided. Bicycle facilities are to be lockable, accessible, paved, and lit during normal business hours.

Currently, the proposed policies that will be implemented through the City of Richland Zoning Ordinance, Title 23 of the city code, do not have parking standards for laboratories or research and development uses. The City of Richland planning staff has agreed to work with PNNL staff to determine the appropriate parking standard. This parking standard will be applied to each new site development plan on a case-by-case basis based on the proposed use of each new facility. The planning team has recommended two options to PNNL for the parking standard for research and development uses. The first would be a one parking space per one employee ratio with a ten percent ratio of the total number for visitor parking. The second would be one parking space per 750 gsf of research and development space with no specific requirement for visitor parking. The parking ratio at this time has not been decided upon.

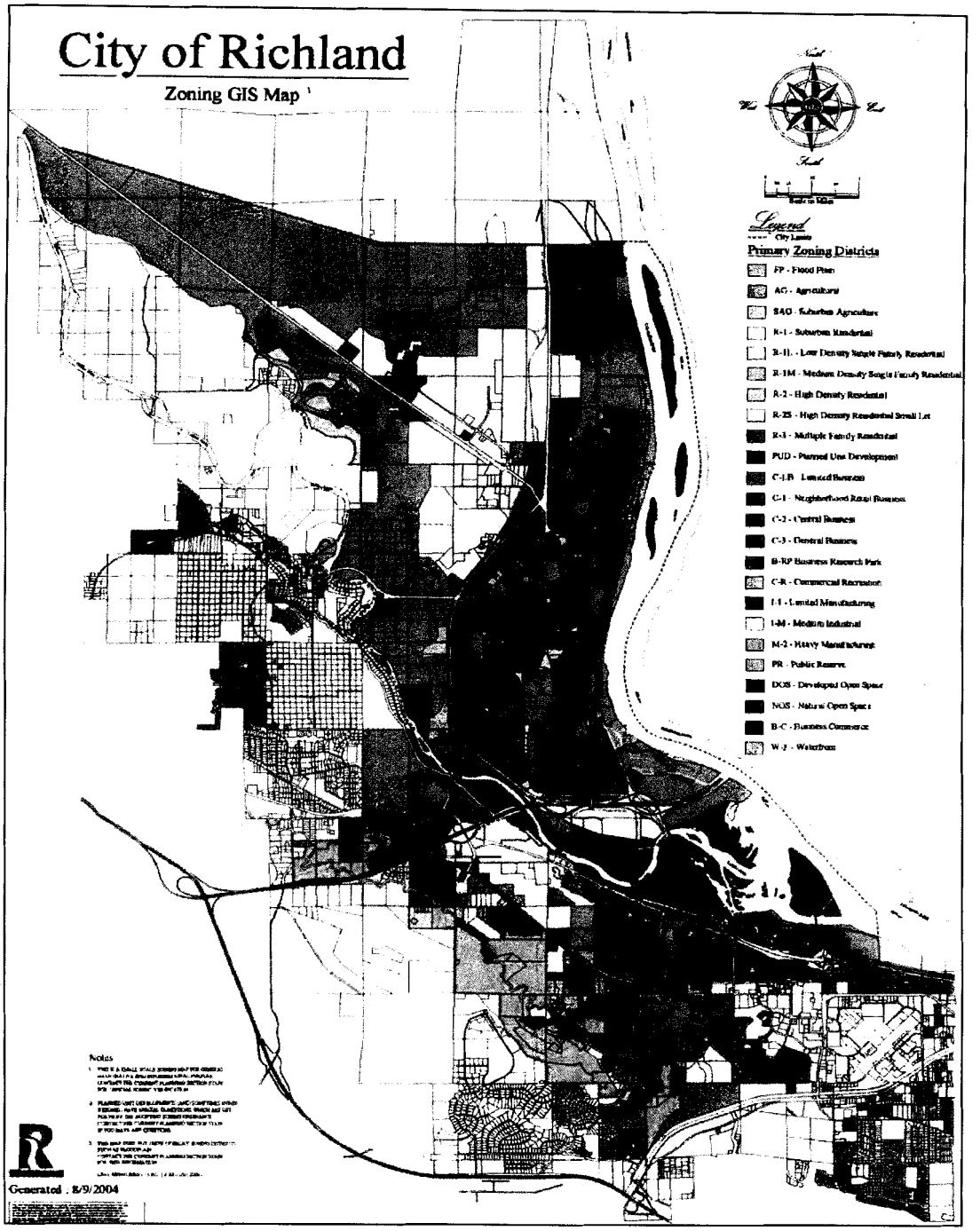


Figure 5.1.B.a – *City of Richland zoning map*

5.3
Property Ownership

The 600-acre PNNL campus includes 350 acres of U.S. government/DOE-owned property, 30 acres south of Horn Rapids Road where EMSL is located, 100 acres north of Horn Rapids Road between Stevens Drive and George Washington Way, known as the Horn Rapids Triangle, and 200 acres of land between the north edge of the Horn Rapids Triangle and 300 Area.

The portions of the CRL which are planned to be U.S. government/DOE facilities should be located on U.S. government property, whether this is on the Horn Rapids Road Triangle property, or on the same parcel where the EMSL facility is located, or on a combination of both. This can be achieved by separating the appropriate program elements based on capability and adjacency relationships. Federal development/facilities occurring on federal land is the norm, but private development/facilities can occur on federal land as well or federal development/facilities can occur on private land. These options are all feasible but some of these options require a lengthy process to structure the legal agreements or to transfer property ownership and obtain all the required approvals.

Land to the south of Battelle Boulevard within the PNNL campus (the Transitional sector) is also largely undeveloped, although various private ventures have been proposed and built.

Land immediately west of Stevens Drive belongs to the Port of Benton, which includes the planned industrial development within the Tri-Cities Science and Technology Park–West Campus. Land to the east of George Washington Way is predominantly in Port of Benton ownership within the Tri-Cities Science and Technology Park–East Campus.

Within the Port of Benton property, PNNL currently leases six facilities from private developers. They are the Laboratory Support Building (LSB); Applied Process Engineering Laboratory (APEL); and the Sigma 2, Sigma 3, Sigma 4 and Sigma 5 buildings, totaling approximately 205,000 gsf. PNNL also leases approximately 95,000 gsf at 2400 Stevens Drive from a private developer.

The land between the PNNL campus and the Columbia River is generally undeveloped, but several new proposals for development have been suggested for the undeveloped waterfront. One notable proposal is the planned "River Walk" mixed-use development on 23 acres located on the Columbia River waterfront at the far eastern end of Battelle Boulevard. These proposals are under the direction of the Port of Benton.

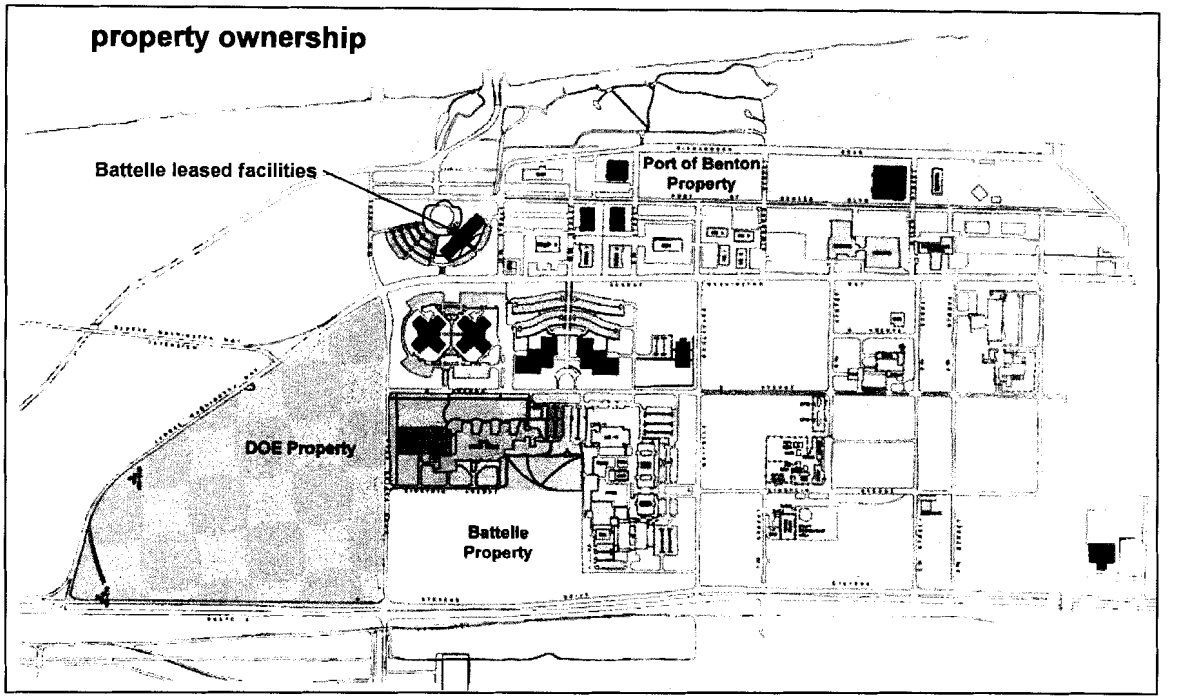


Figure 5.3.a *– PNNL Campus property ownership diagram (exclusive of 220 acres adjacent to the DOE property recently transferred from DOE-EM to DOE-SC)*

8.0
Master Plan Options

Phasing

This master plan update provides analysis of the existing PNNL campus, and recommendations to accommodate anticipated growth for the next 20 years, while dramatically transforming PNNL's campus into a dynamic, integrated, and more pedestrian-oriented environment.

The master plan illustrates the potential for approximately 2,700,000 gsf of growth, in three general areas:

- **Phase A – Short-Term**
  Initial PNNL growth within the Campus Core sector, for a total of approximately 430,000 gsf.

- **Phase B – Mid-Term**
  PNNL 10-Year Growth Agenda – approximately 765,000 gsf within the Campus Core sector.

- **Phase C – Long-Term**
  Future Growth: 20 Years – approximately 2,700,000 gsf within the Big Science and Transitional sectors.

The master plan proposes to concentrate initial growth (CRL and the 10-Year Growth Agenda) in the Big Science and Campus Core sectors immediately north of Horn Rapids Road and south to Battelle Boulevard in order to increase campus density with other future growth south of Battelle Boulevard. This increased density will concentrate a critical mass of the campus population necessary to support added campus common-use facilities, and will place buildings in close proximity to one another to promote pedestrian circulation, increased security, and scientific collaboration and interaction.

The master plan recognizes an existing land-use pattern and proposes to strengthen it in the development of the campus to strategically locate programmatic components of the growth. Six planning sectors are identified as follows:

- Big Science sector, north of Horn Rapids Road, is defined for radiological science facilities and industrial facilities.

- Campus Core sector, between Horn Rapids Road and Battelle Boulevard (north-south) and George Washington Way and Stevens Drive (east-west), is defined for general, non-radiological science facilities.

- Transitional sector, south of Battelle Boulevard, is defined to combine further growth of general science facilities and joint programs with the Tri-Cities Science and Technology Park further south.

- Flex sector/Port of Benton, east of George Washington Way, is defined as leased buildings for office and research use.

- Community Interface sector, immediately south of the Battelle-owned property labeled Transitional, is defined for private development of general science and office facilities.

- Waterfront/Mixed Use sector, between the Flex sector on the west and the Columbia River on the east, is defined for residential and commercial use.

Phase A – Short-Term Growth

The initial Phase A, Short-Term Growth development for the PNNL campus will accommodate the CRL and initial PNNL growth. The proposed development will take place within the Campus Core and Big Science sectors.

The proposed program elements within the Phase A, Short-Term Growth are as follows:

- BSEL – Bioproducts, Sciences, and Engineering Laboratory – approximately 31,000 gsf
- PSF - Physical Sciences Facility – approximately 201,000 gsf
- BSF - Biological Sciences Facility – approximately 74,000 gsf
- CSF - Computational Sciences Facility – approximately 74,000 gsf
- Other Short Term Growth – approximately 50,000 gsf

Campus Master Planning Principles for Phase A

Parking

The parking ratio utilized for the *Campus Master Plan Update* is one parking space per one employee. The exterior spaces and associated spatial experience for an employee parking a car and arriving at a specific building is an important experience, which if designed efficiently, will positively affect the workplace environment. A new drop-off and visitor parking area could be provided off of Battelle Boulevard to enhance the visitor entry arrival sequence and improve the image and identity of the PNNL campus.

Open Space

To increase opportunities for campus interaction, both informal and formal, one goal for the PNNL campus is to create a series of interconnected exterior landscape spaces within the Campus Core sector. The development of the pedestrian mall will serve as the unifying element for the PNNL campus. The pedestrian mall will add structure and will organize the PNNL campus into exciting outdoor environments for both employees and visitors to the PNNL campus. The closure of a portion of Horn Rapids Road will afford an improved pedestrian and visual connection between the Big Science sector and Campus Core sector.

Site Security

Several proposed site development improvements are required to accommodate the new security and parking paradigm. New vehicular entry points off of George Washington Way at 9th Street, 11th Street, Horn Rapids Road, and Stevens Drive are required. The Border Interdiction Detection Track facility can be accommodated within the service court area of the PSF. With the strategic

implementation of the site security elements in a phased approach, any negative perception of these security measures from the community or PNNL employees can be minimized.

Service Areas

To control and improve service access and material handling on the PNNL campus, the service access will be controlled from access points off of George Washington Way, Horn Rapids Road, and Einstein Avenue, with a potential service access drive off of Stevens Drive. The goal for service and material handling is to have common, shared access points with shared service courts between buildings. This system will assist in improving the overall site security level of protection.

Site Utilities

To support the proposed new growth of facilities on the PNNL campus, upgrades to the site utility infrastructure are required. An organized approach to the delivery of these services to the new facilities is required; therefore, site utility corridors have been planned within the PNNL campus. The site utility corridors created to support planned Phase A growth have also considered the future expansion capabilities of these site utilities to accommodate future building development in Phases B and C for the PNNL campus.

Sustainability

The overriding principles for sustainability and stewardship for the PNNL campus are identified and outlined in Section 4.9, Sustainability. The campus master plan supports and encourages the use of leading-edge sustainable design technologies, where possible, to meet the goals of each project.

Phase B – Mid-Term Growth

The Phase B, Mid-Term Growth development for the PNNL campus will accommodate the PNNL 10-Year Growth Agenda. The proposed development will take place within the Campus Core sector.

The proposed program elements within Phase B, Mid-Term Growth include such things as:

- EMSL North Lab/Office Pod – 55,000 gsf
- System Development Lab – 150,000 gsf
- Other miscellaneous growth – 130,000 gsf (Refer to table D10.1).

Campus Master Planning Principles for Phase B

Parking

The total square footage for Phase A & B could be as much as 765,000 gsf. The parking ratio utilized for the *Campus Master Plan Update* is one parking space per one employee for Phase B. Parking spaces to support Phase B are located at the perimeter of the site.

Open Space
To increase opportunities for campus interaction, both informal and formal, one goal for the PNNL campus is to create a series of interconnected exterior landscape spaces within the Campus Core sector. The pedestrian mall continues to be the overriding organizing factor on the PNNL campus, linking exciting outdoor environments for both employees and visitors to the PNNL campus.

Site Security
With each phase of development, the strategic phased implementation of the site security elements will continually be assessed and evaluated to ensure that the proper level of protection is met.

Service Areas
To control and improve service access and material handling to the PNNL campus, the service access will be controlled from access points off of George Washington Way, Horn Rapids Road, and Einstein Avenue, with a potential service access drive off of Stevens Drive. The goal for service and material handling is to have common, shared access points with shared service courts between buildings and this will assist in improving the overall site security level of protection. The proposed Phase B Growth Agenda I service access will be off of George Washington Way. The proposed Phase B EMSL expansion and Growth Agenda II will utilize the common service court created in Phase A. This service court is associated with the existing EMSL and with the proposed BSF and CSF facilities off of Horn Rapids Road and Einstein Avenue.

Site Utilities
With each phase of development, the evaluation of the capacity and delivery/routing of site utilities is required to determine if upgrades to accommodate the proposed new growth of each facility on the PNNL campus is required. If site utility upgrades are required, these upgrades should take place within the existing and planned site utility corridors created to support planned, phased growth of the PNNL campus.

Sustainability
The overriding principles for sustainability and stewardship for the PNNL campus are identified and outlined in Section 4.9, Sustainability. The campus master plan supports and encourages the use of leading-edge sustainable design technologies where possible to meet the goals of each project.

Phase C – Long-Term Growth

The Phase C, Long-Term Growth development for the PNNL campus will accommodate the PNNL Future Growth to 20 years. The proposed development will take place within the Big Science and Transitional sectors and could represent approximately 2,700,000 gsf of new facilities, inclusive of Phase A and B.

The total gross square footage, both existing and planned space, represented within the *Campus Master Plan Update* is approximately 4,800,000 gsf.

Campus Master Planning Principles for Phase C

Parking

The general planning principle is to locate the parking facilities at the perimeter of the site to allow for positive open spaces that will act as the controlling form of the master plan. The exterior spaces and associated spatial experience for an employee parking a car and arriving at a specific building is an important experience, which if designed efficiently, will positively affect the workplace environment.

Circulation/Traffic

To create the pedestrian mall within the Transitional sector similar to that of the Campus Core sector of the PNNL campus, the vehicular circulation will be pushed to the site perimeter, allowing the pedestrian circulation to be mainly within the center or heart of the campus. Clear and identifiable entry points to the PNNL campus have been provided, together with the planned roadway improvements to George Washington Way and Stevens Drive, with a proposed new vehicular entry/drop-off of Battelle Boulevard. A secondary entry to the Transitional sector opposite the ROB and MATH facilities creates an entry motor court for visitors to the PNNL campus south of Battelle Boulevard growth.

Open Space

Increasing opportunities for both informal and formal campus interaction by creating a series of interconnected exterior landscape spaces within the campus core is a goal for the PNNL campus. The pedestrian mall will become the unifying element for the PNNL campus. The pedestrian mall will add structure and organize the campus for exciting outdoor environments for both employees and visitors to PNNL.

Site Security

With each phase of development, the strategic phased implementation of the site security elements will continually be assessed and evaluated to ensure that the proper level of protection is met.

Service Areas

To control and improve service access and material handling to the PNNL campus, the service access will be controlled from access points off of George Washington Way, Horn Rapids Road, and Einstein Avenue, with a potential service access drive off of Stevens Drive. The goal for service and material handling is to have common, shared access points with shared service courts between buildings, which will improve the site security level of protection.

Site Utilities

With each phase of development, the evaluation of the capacity and delivery/routing of site utilities is required to determine whether upgrades to accommodate the proposed new growth of each facility on the PNNL campus will be required. If site utility upgrades are required, these upgrades should take place within the existing and planned site utility corridors created to support planned phased growth of the PNNL campus.

Sustainability

The campus master plan supports and encourages the use of leading-edge sustainable design technologies where possible to meet the goals of each project.

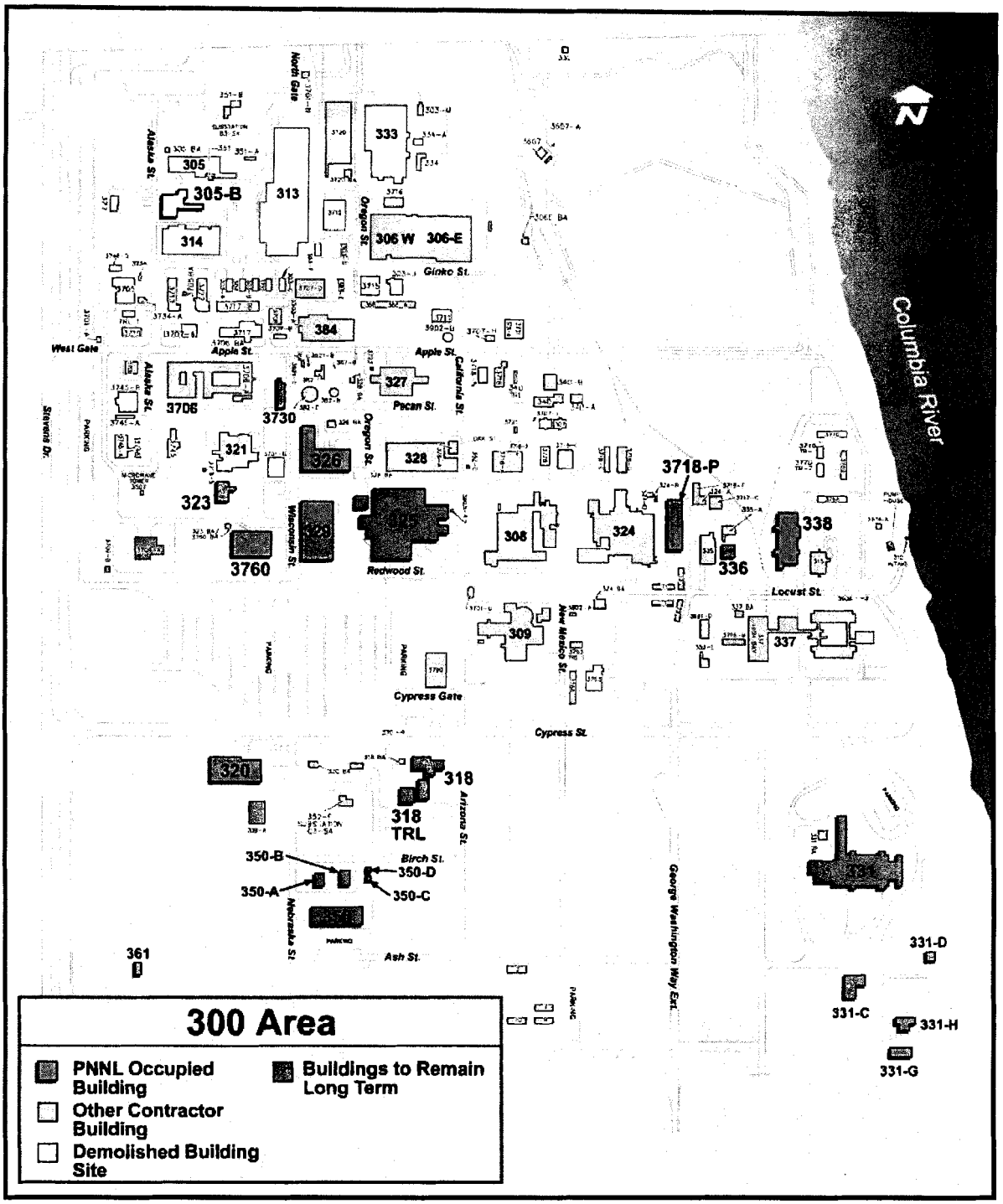
Attachment 2

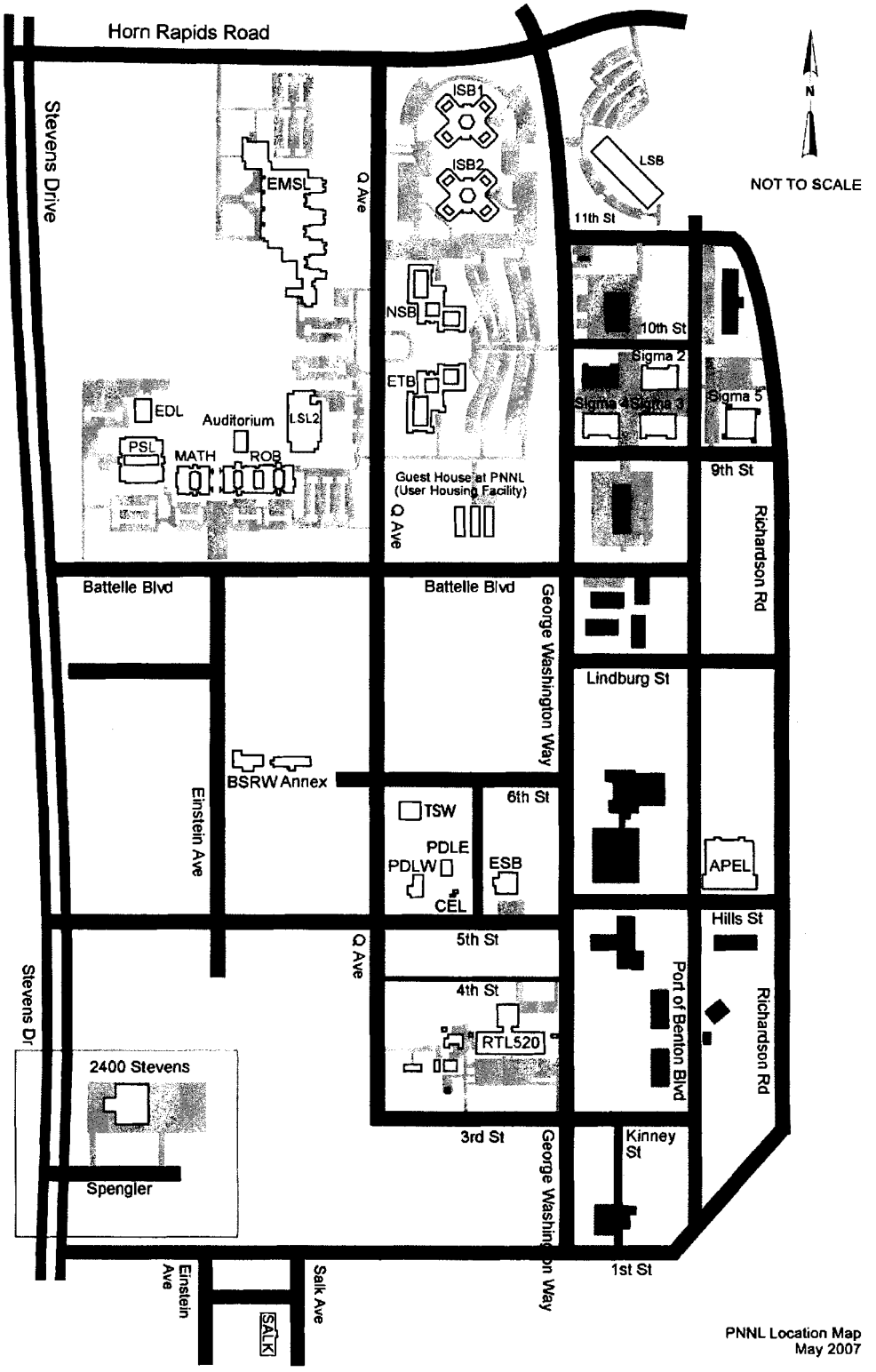
Inventory and Maps of Buildings

Pacific Northwest National Laboratory

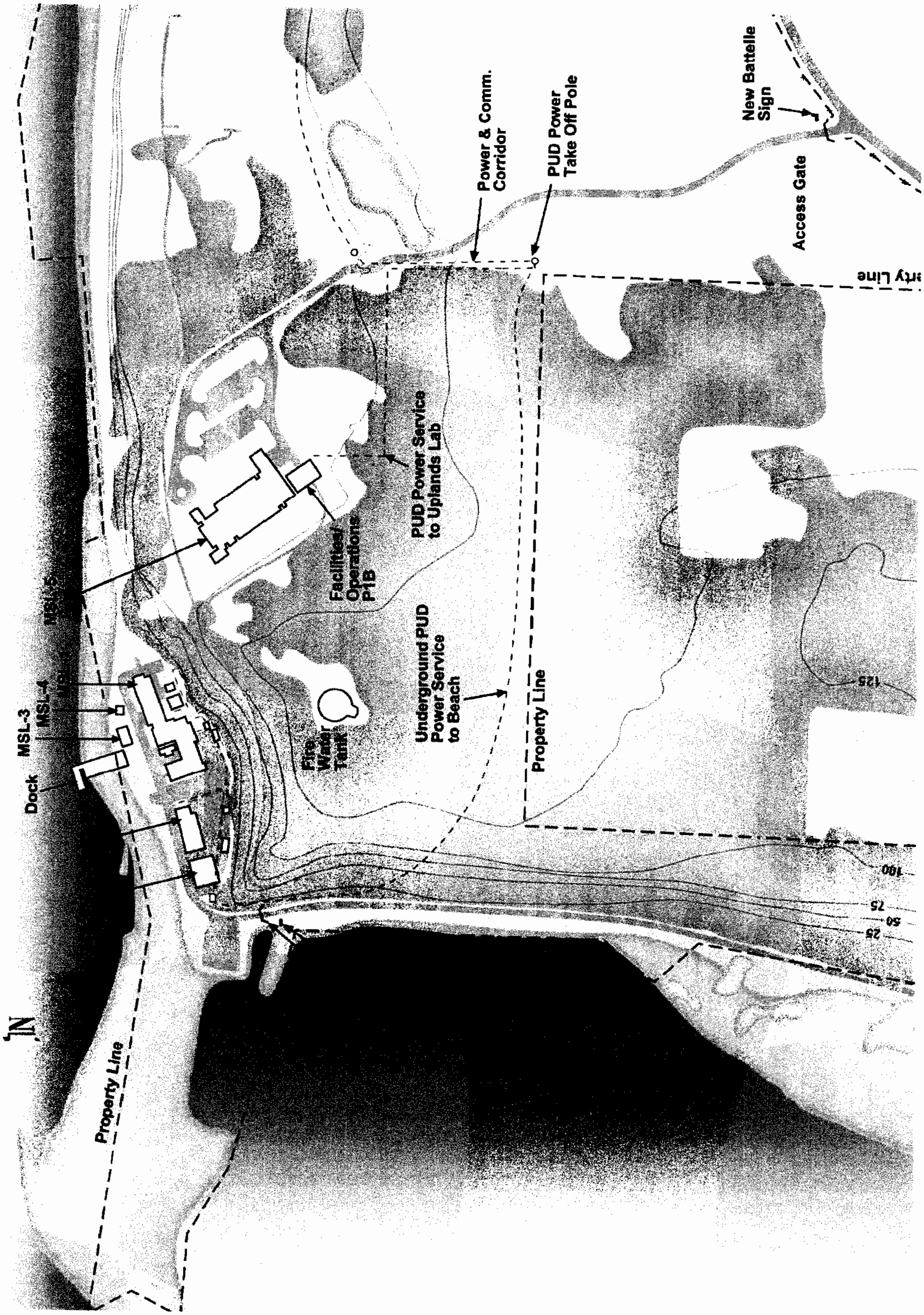
		Building Square Footage						
	Facility	Gross Sq. Ft.	Office	Lab 1	Lab 2	Lab 3	Storage	Common
Emergency Radiation Detection	100ERDS	96	0	0	0	0	82	14
2400 Stevens	2400STV	93,351	25,653	16,969	5,162	0	3,406	42,161
2410 Stevens Warehouse Facility	2410STV	2,000	0	0	0	0	2,000	0
2440 Stevens	2440STV	1408	746	0	0	0	0	662
Emergency Radiation Detection	300ERDS	96	0	0	0	0	82	14
Radiological Calibrations Lab	318	37,025	5,066	10,677	3,096	0	1,019	17,167
Office Trailer 318	318TRL4	3,669	1,340	1,574	0	0	0	755
Analytical And Nuclear Research Lab	320	31,427	2,614	6,437	2,931	5,044	189	14,212
Mechanical Properties Laboratory	323	4,150	145	2,255	0	0	0	1,750
Material Science Laboratory	326	63,334	9,062	8,793	12,098	0	2,389	30,992
Chemical Science Laboratory	329	39,420	3,585	5,698	1,845	7,620	2,345	18,327
Life Sciences Laboratory 1	331	115,127	15,202	4,717	22,504	11,918	1,060	59,726
Interim Waste Storage Disposal	331C	5,116	0	0	0	0	4,724	392
Biomagnetic Effects Laboratory	331D	1,280	0	272	144	0	794	70
Interim Tissue Repository	331G	1,200	0	1,064	0	0	0	136
Aerosol Wind Tunnel Research Fac	331H	3,557	0	0	1,965	0	0	1,592
High Bay Testing Facility	336	6,438	322	2,754	1,192	0	0	2,170
Prototype Engineering Laboratory	338	18,315	1,255	10,926	0	0	165	5,969
Plant Operations & Maintenance Fac	350	22,048	3,885	13,672	0	0	0	4,491
Paint Shop	350A	1,400	0	915	0	0	370	115
Warehouse 350B	350B	2,122	0	0	0	0	2,000	122
Storage Building 350C	350C	212	0	0	0	0	180	32
Oil Storage Facility	350D	960	0	0	0	0	875	85
Modular Equipment Shelter	361	384	0	300	0	0	0	84
Warehouse Space	3718P	12,000	110	0	0	0	5,374	6,516
Gamma Irradiation Facility	3730	3,103	0	858	0	825	756	664
3760 Office Building	3760	21,908	6,494	2,163	0	0	3,959	9,292
Monitoring Station	614	110	0	0	0	0	89	21
Elevator Control Building	622A	170	0	0	0	0	0	170
Pilot Balloon Release Building	622B	144	0	107	0	0	0	37
Storage Building 622C	622C	1,170	0	0	0	0	1,128	42
Meteorology Lab	622R	8,960	1,071	3,873	540	0	488	2,988
Nike Bunker	6652L	4,663	0	3,964	0	0	0	699
Whole Body Counter	747A	2,083	0	1,563	0	0	0	520
Office Trailer 747A	747ATRL1	1,149	1,149	0	0	0	0	0
Albuquerque NM	ALBUQUERQUE	6,617	6,617	0	0	0	0	0
RRC Laboratory Annex	ANNEX	9,311	452	2,464	1,983	0	114	4,298
Applied Processing Engineering Lab	APEL	57,196	8,482	18,231	11,413	0	0	19,070
Auditorium	AUD	12,110	0	0	0	0	0	12,110
Battelle Receiving & Shipping Whse	BRSW	9,654	825	0	0	0	6,724	2,105
Battelle Seattle Research Center	BSRC	20,725	8,735	520	0	0	240	11,230
Battelle Washington Office Building	BWO	36,949	18,513	0	0	0	335	18,101
Cambridge Office	CAMBRIDGE	738	0	0	0	0	0	738
Chemical Engineering Laboratory	CEL	600	0	88	339	0	0	173
Consolidated Information Center	CIC	30,124	30,124	0	0	0	0	0
Engineering Development Laboratory	EDL	16,071	946	7,647	1,535	0	0	5,943
Environmental Molecular Science Lab	EMSL	208,775	31,412	21,081	48,782	0	2,004	105,496
Engineering Support Building	ESB	12,595	3,398	2,306	143	0	2,430	4,318
Environmental Technology Building	ETB	100,358	47,785	3,810	0	0	863	47,900
Grounds Equipment Storage	GES	2,100	0	0	0	0	2,100	0
Guest House at PNNL	GUESTHOUSE	29,108	609	0	0	0	0	28,499
Information Sciences Building I	ISB1	50,200	25,798	5,498	0	0	318	18,586
Information Sciences Building II	ISB2	60,080	29,955	5,949	0	0	1,188	22,988
Lift Station	LS	100	0	0	0	0	0	100
Laboratory Support Building	LSB	83,921	41,017	677	0	0	2,397	39,830

		Building Square Footage						
	Facility	Gross Sq. Ft.	Office	Lab 1	Lab 2	Lab 3	Storage	Common
Life Sciences Laboratory 2	LSL2	102,107	12,096	2,537	840	36,540	3,964	46,130
Chemical Storage &Transfer Facility	LSL2A	764	0	624	0	0	0	140
Portable Chemical Storage	LSL2B	204	0	176	0	0	0	28
Mathematics Building	MATH	29,416	9,507	4,596	0	0	36	15,277
Beach Office/Laboratory	MSL1	12,748	911	834	6,881	0	39	4,083
Warehouse/Shop MSL2	MSL2	3,023	0	1,847	0	0	0	1,176
Filter Building	MSL3	489	0	0	0	0	420	69
Pumphouse	MSL4	100	0	0	0	0	0	100
Uplands Office/Laboratory	MSL5	24,292	4,553	449	5,831	0	453	13,006
Chemical Storage MSL5A	MSL5A	204	0	176	0	0	0	28
Chemical Storage MSL5B	MSL5B	204	0	176	0	0	0	28
Cold Storage	MSL5C	193	0	0	0	0	175	18
Robb House	MSL6	1,250	0	0	0	0	0	1,250
Marine Sciences Laboratory 7	MSL7	9,688	5,546	0	0	0	37	4,105
National Security Building	NSB	100,358	51,010	907	0	0	471	47,970
Process Development Laboratory East	PDLE	3,882	157	3,627	0	0	0	98
Process Development Laboratory West	PDLW	6,826	438	4,055	0	0	0	2,333
Plant Growth Facility 1	PGF1	1,760	0	1,697	0	0	0	63
Plant Growth Facility 2	PGF2	1,200	0	1,165	0	0	0	35
Plant Growth Facility 3	PGF3	1,200	0	1,165	0	0	0	35
Plant Growth Facility 4	PGF4	1,200	0	1,165	0	0	0	35
Plant Growth Facility 5	PGF5	640	0	540	0	0	0	100
Port Of Pasco	POP	10,000	0	0	0	0	10,000	0
Battelle Portland Office-DOE Lease	PORTLAND	4,592	2,577	0	0	0	21	1,994
Port of Skamania	POS	2,620	620	0	0	0	2,000	0
Physical Science Laboratory	PSL	89,265	20,592	9,471	26,096	0	670	32,436
Research Operations Building	ROB	69,586	30,403	2,335	0	0	2,094	34,754
Radiochemical Processing Laboratory	RPL	144,820	15,325	8,645	2,762	32,608	6,984	78,496
Richland River Station	RRS	150	0	0	0	0	0	150
Chemical And Flammable Storage	RTL510	577	0	0	0	0	498	79
Research Technology Laboratory	RTL520	56,158	12,560	2,175	1,991	11,666	286	27,480
Fire Riser Facility	RTL524	192	0	0	0	0	0	192
Radioactive Storage	RTL530	172	0	0	0	145	0	27
Paper Shredder Facility	RTL540	810	0	0	0	0	752	58
Technical Services	RTL550	4,365	853	2,860	0	0	0	652
Utility Building	RTL560	3,925	0	0	0	0	150	3,775
Autoclave Center	RTL570	678	0	0	580	0	0	98
Crafts Shop	RTL580	1,448	0	1,248	0	0	0	200
Warehouse RTL590	RTL590	4,001	0	0	0	0	3,862	139
Salk Building	SALK	4,688	1,545	1,591	0	0	0	1,552
Office Building SIGMA2	SIGMA2	20,100	12,003	0	0	0	70	8,027
Office Building SIGMA3	SIGMA3	20,090	11,110	331	0	0	318	8,331
Office Building SIGMA4	SIGMA4	20,530	11,956	0	0	0	0	8,574
Office Building SIGMA5	SIGMA5	47,900	21,845	3,206	4,608	0	1,082	17,159
Technical Support Warehouse	TSW	8,000	0	0	0	0	7,270	730
Joint Global Change Research Instit	U OF MD JRI	12,346	6,516	113	0	0	170	5,547
	Totals	**2,085,688**	**564,490**	**225,533**	**165,261**	**106,366**	**94,009**	**930,029**


300 Area
PNNL Occupied Building
Other Contractor Building
Demolished Building Site
Buildings to Remain Long Term
Columbia River
North Gate
West Gate
Cypress Gate
Cypress St.
Ginko St.
Apple St.
Pecan St.
Redwood St.
Locust St.
Birch St.
Ash St.
Oregon St.
Wisconsin St.
New Mexico St.
Nebraska St.
Arizona St.
Stevens Dr.
Alaska St.
California St.
Georgia Washington Way Ext.
305
305-B
313
314
333
306 W
306-E
384
3706
3730
327
321
326
328
323
329
3760
3718-P
308
324
338
336
309
337
320
318
318 TRL
350-B
350-A
350-D
350-C
361
331-D
331-C
331-H
331-G



Main PNNL Campus



Sequim, Washington Campus

Attachment 3

Inventory and Maps of Infrastructure/Site Utility Systems

Attachment 3

Inventory and Maps of Infrastructure/Site Utility Systems

Attachment 3 consists of general facilities and infrastructure drawings for utility systems and infrastructure for PNNL.

The PNNL campus primary utility systems and infrastructure consist of:

- Electrical
- Water and Sewer
- IT (phone/LAN)
- Natural gas

PNNL utilizes other organizations as utility systems owners and providers/operators for its buildings dependent on their location and land ownership.

The PNNL campus consists of:

- Federal land with buildings on the Hanford Site (principally in Hanford's 300 Area) and federal land south of the 300 Area recently transferred to DOE-SC for PNNL.
- Land within the City of Richland with buildings on:
    - DOE designated PNNL Site
    - Owned by Battelle on Battelle land
    - Leased buildings on Battelle land
    - Other leased buildings on third-party owned land
- Multiple offsite locations.

Even with these multiple locations, PNNL has established and continues to enhance the integration of the utility systems and infrastructure across the entire PNNL campus addressing the ownership, provider, operator, and investment plans of each.

PNNL's overall goal is to fully integrate the utility systems and infrastructure with, to the greatest extent possible, single owners and single providers/operators for each system – providing long-term, highly reliable and effective (and low) life-cycle cost services.

Currently, the City of Richland is the owner/provider/operator of the electrical, water, and sewer infrastructure and services for the PNNL campus facilities in the City of Richland. In the 300 Area, the Hanford Site Services contractor is the owner/provider/operator of the electrical infrastructure and services and the operator of the water and sewer infrastructure and services. The 300 Area utilities will be enhanced over the next few years to provide a 20-year life for the retained facilities. No changes, if any, to the 300 Area utilities infrastructure and services owner/provider/operator can be expected until completion of the 300 Area utilities-enhancement effort.

Attached are current drawings for some of the key utility systems and infrastructure at the various locations. Offsite locations utility systems and infrastructure are varied based on the location, ownership, and facility/space agreement. No drawings are included.

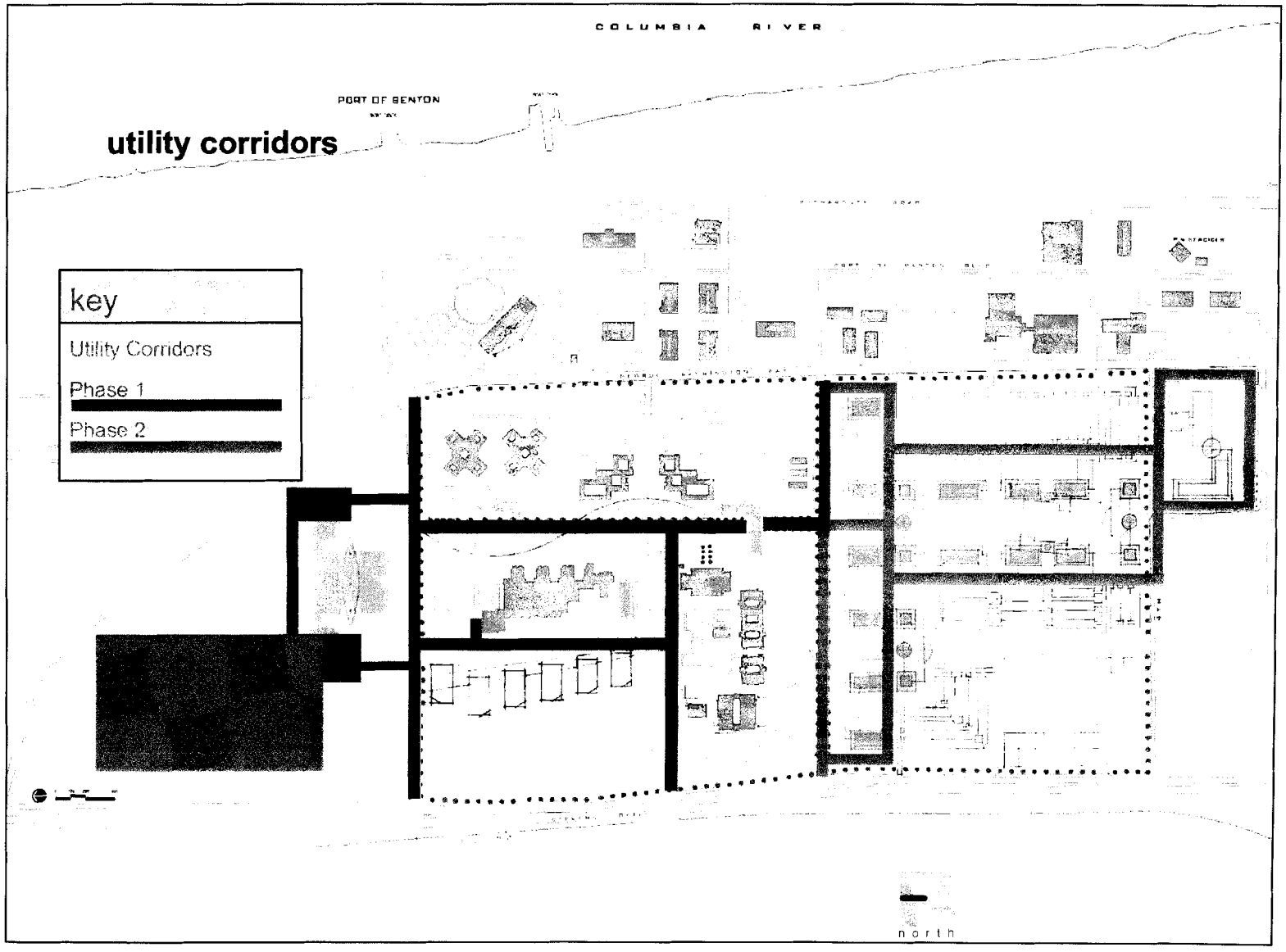


Figure Att3.1. Main PNNL Campus (City of Richland land) Long-Term Utility Corridor Conceptual Site Plan

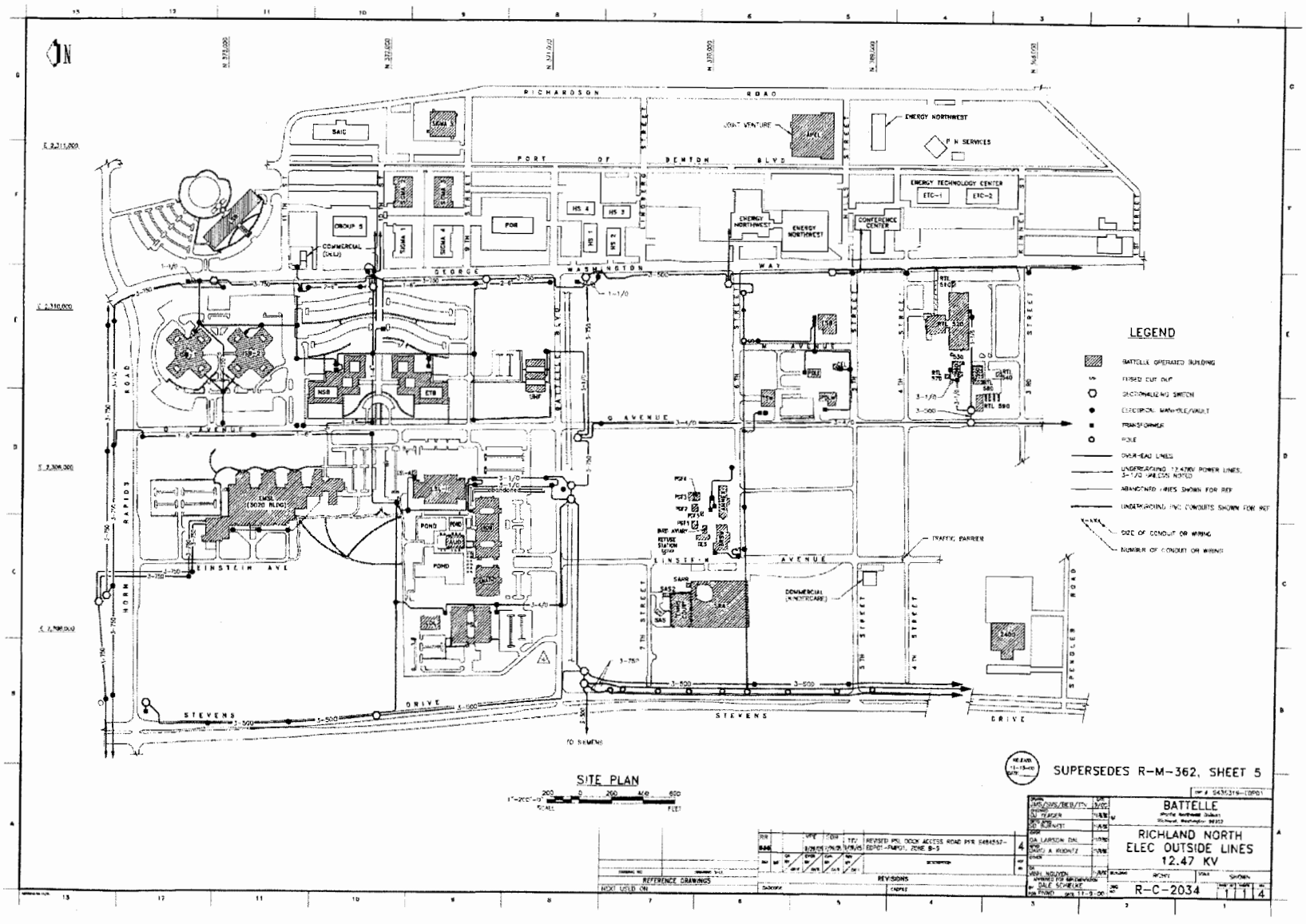


Figure Att3.2. Main PNNL campus Electrical Utility System Plan

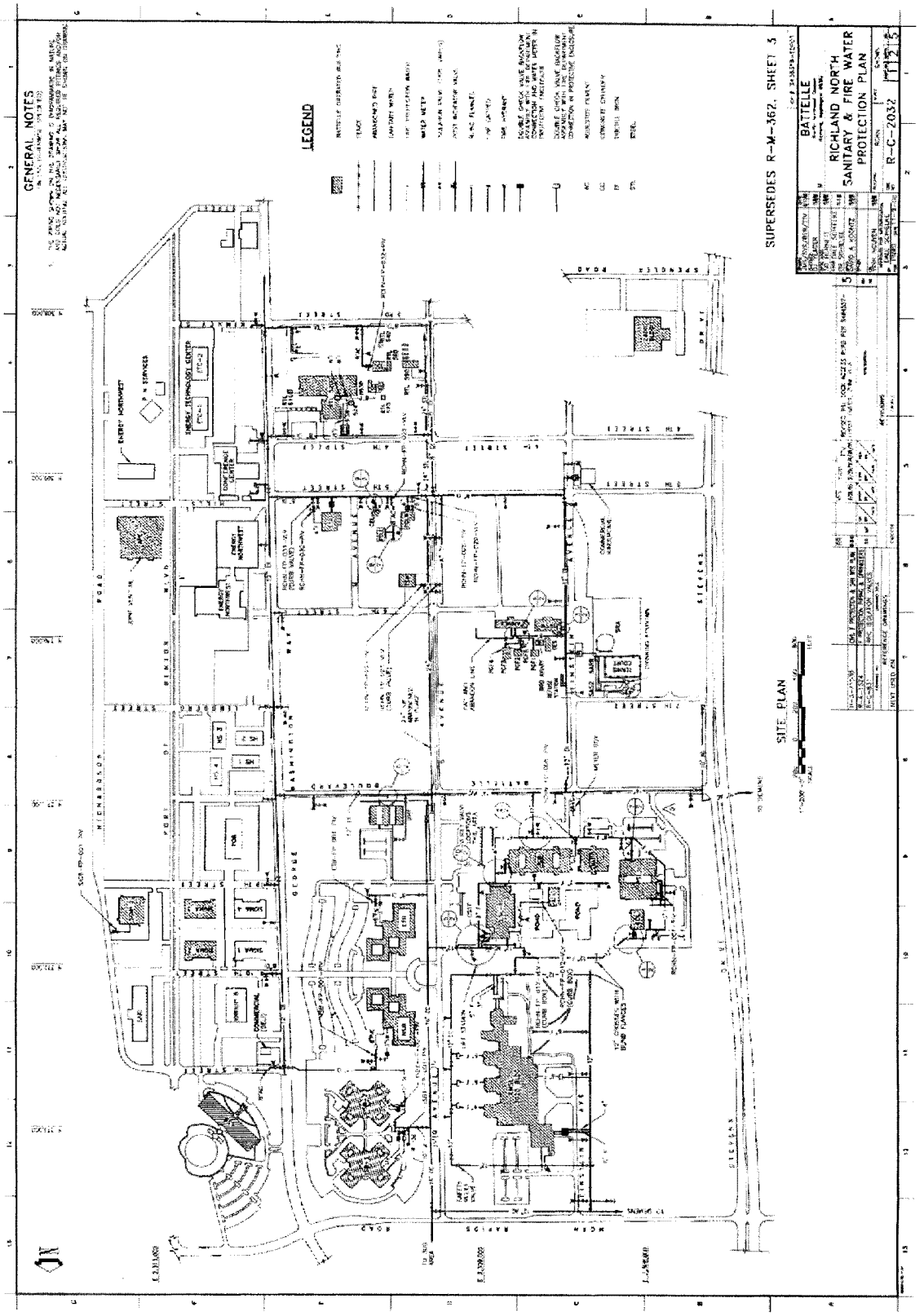


Figure Att3.3. Main PNNL campus Water Utility System Plan

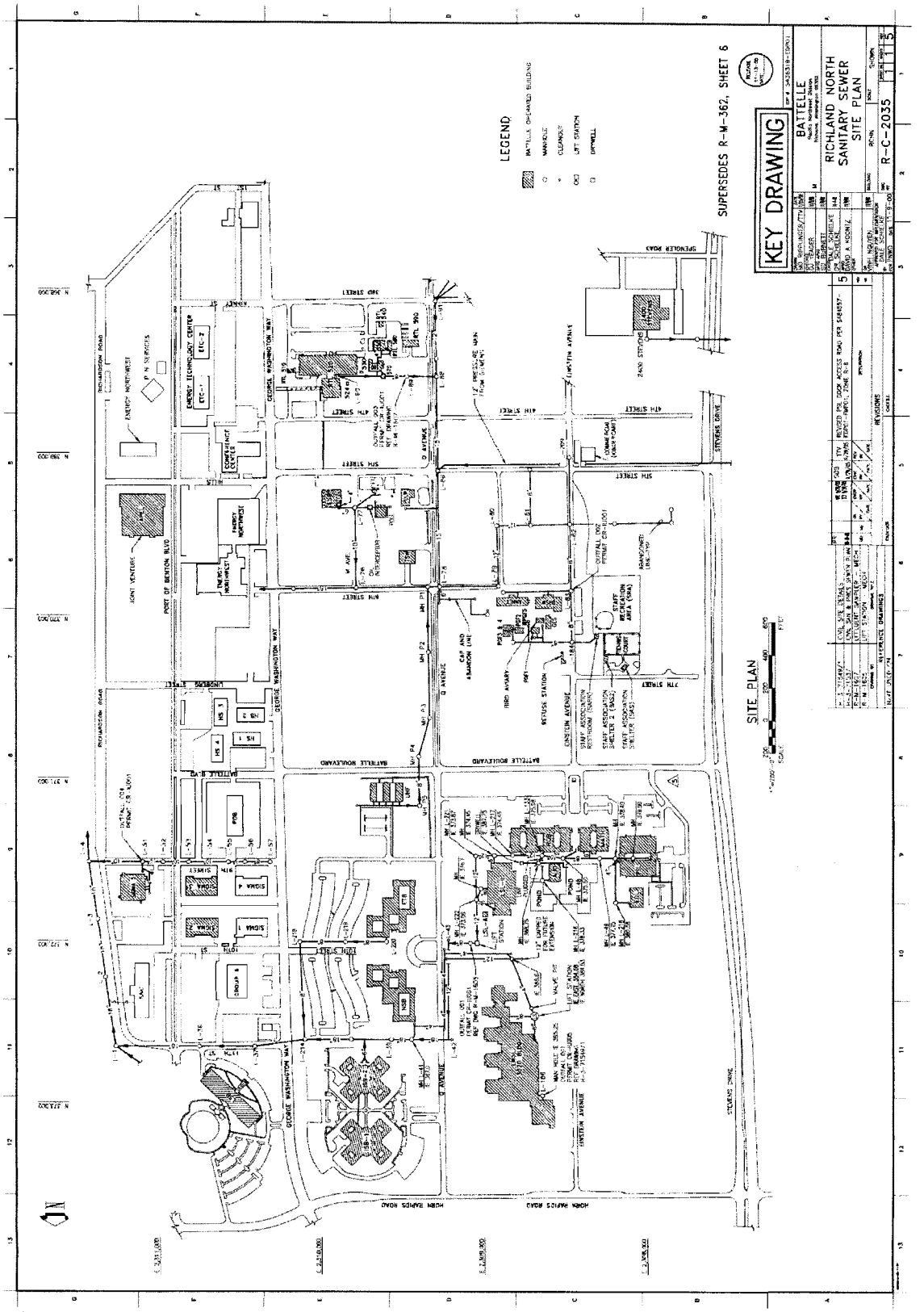


Figure Att3.4. Main PNNL campus Sewer Utility System Plan

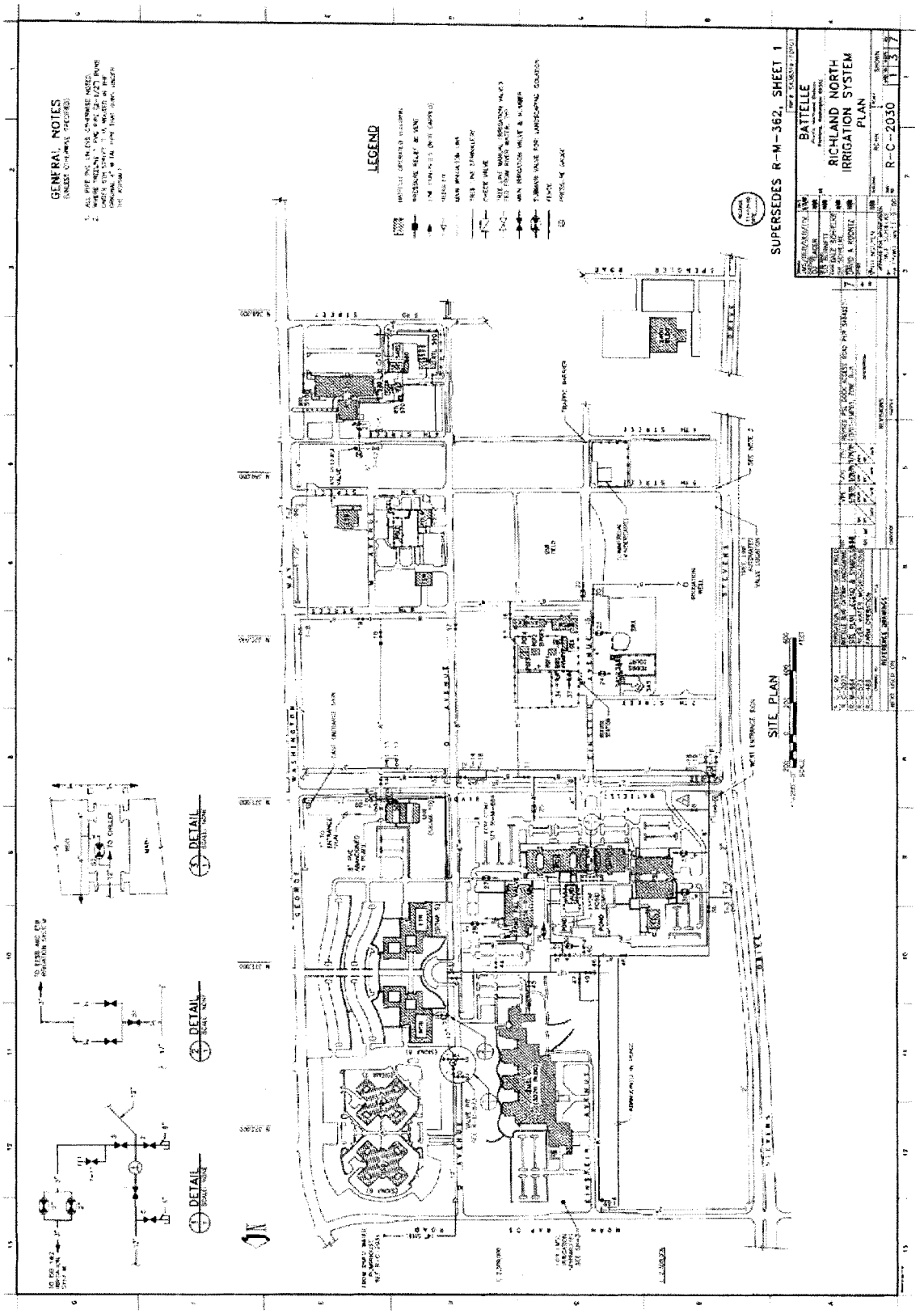


Figure Att3.5. Main PNNL campus Irrigation System Plan

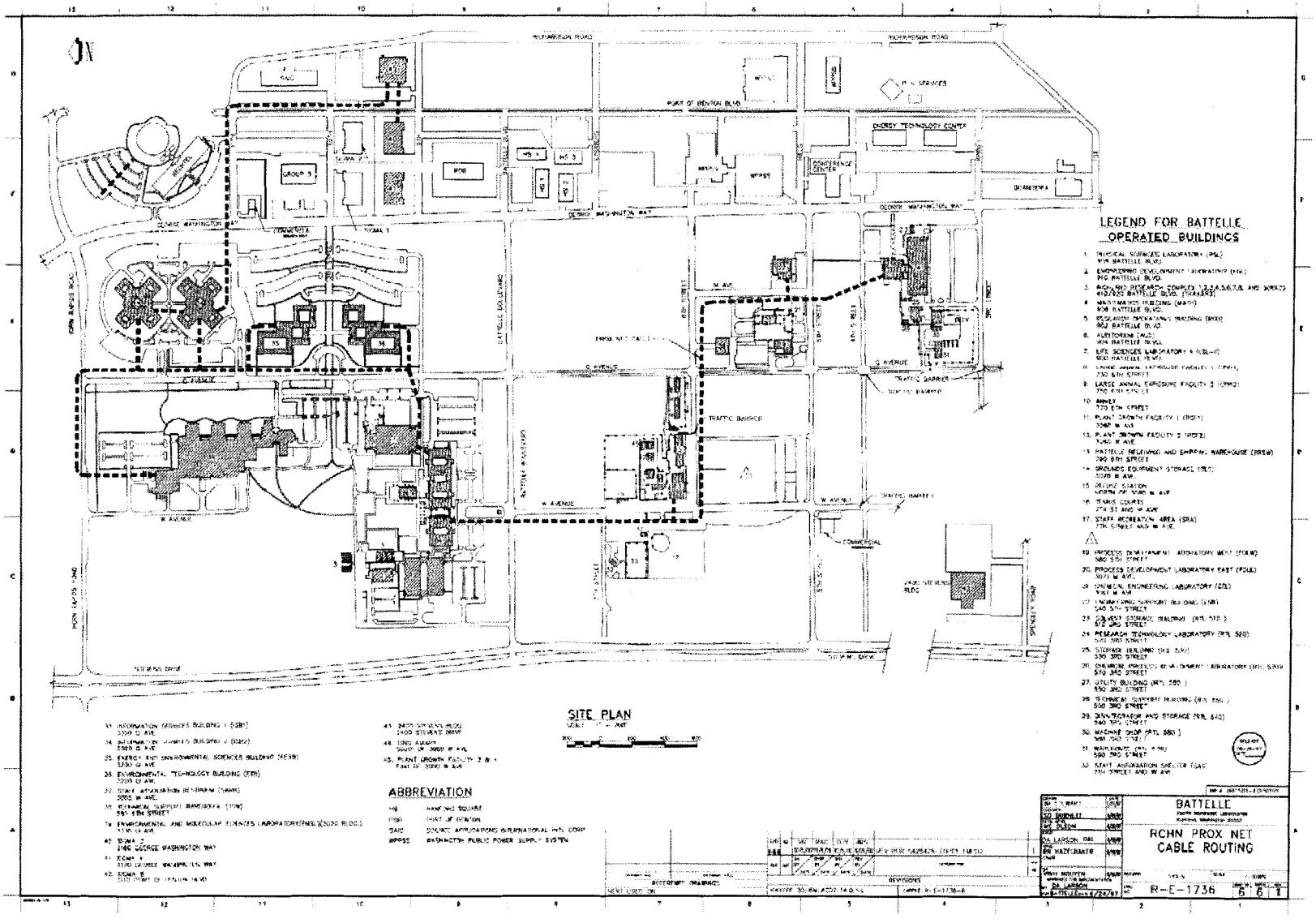


Figure Att3.6. Main PNNL campus IT Cable Routing Plan

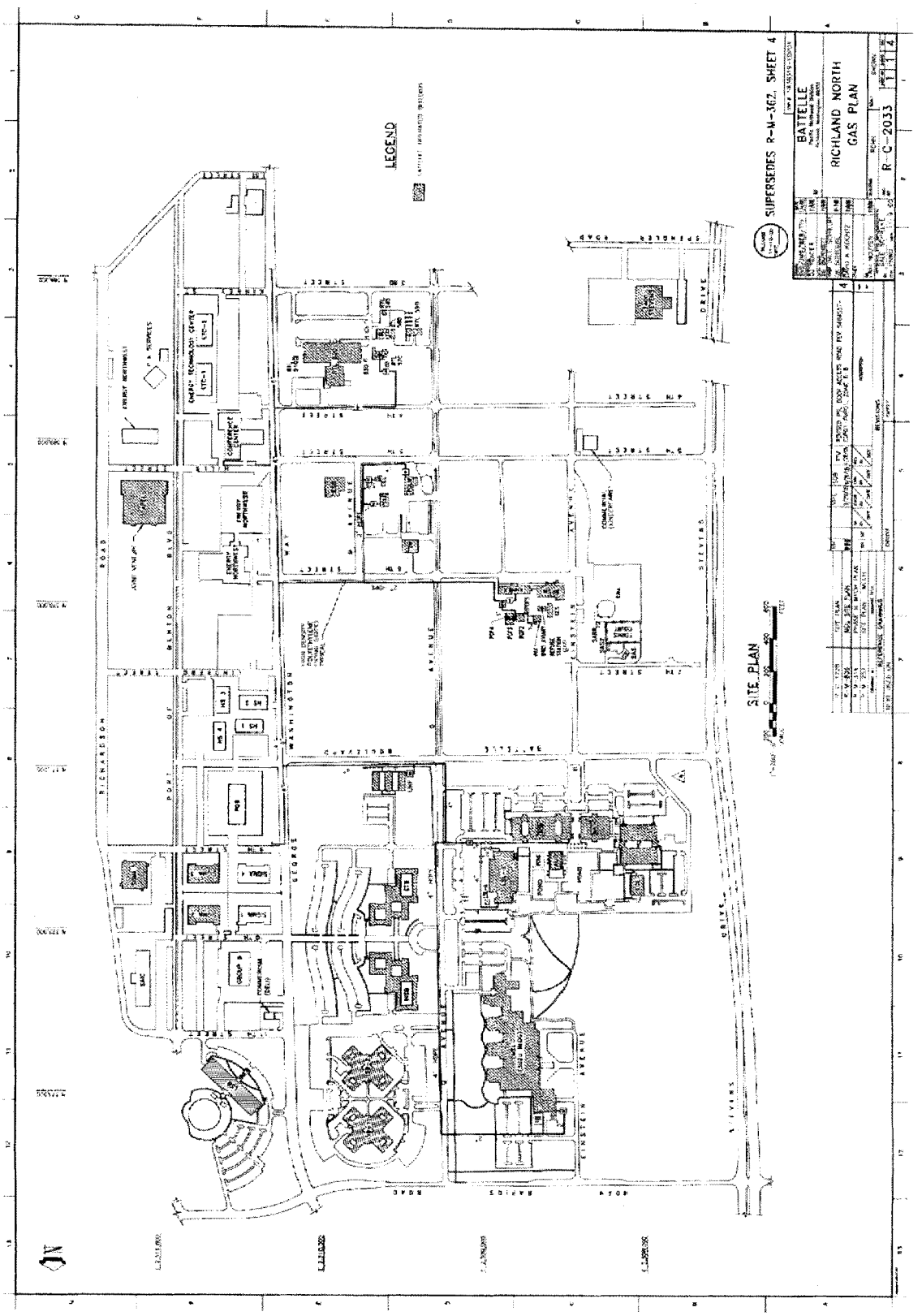


Figure Att3.7. Main PNNL campus Natural Gas Utility System Plan

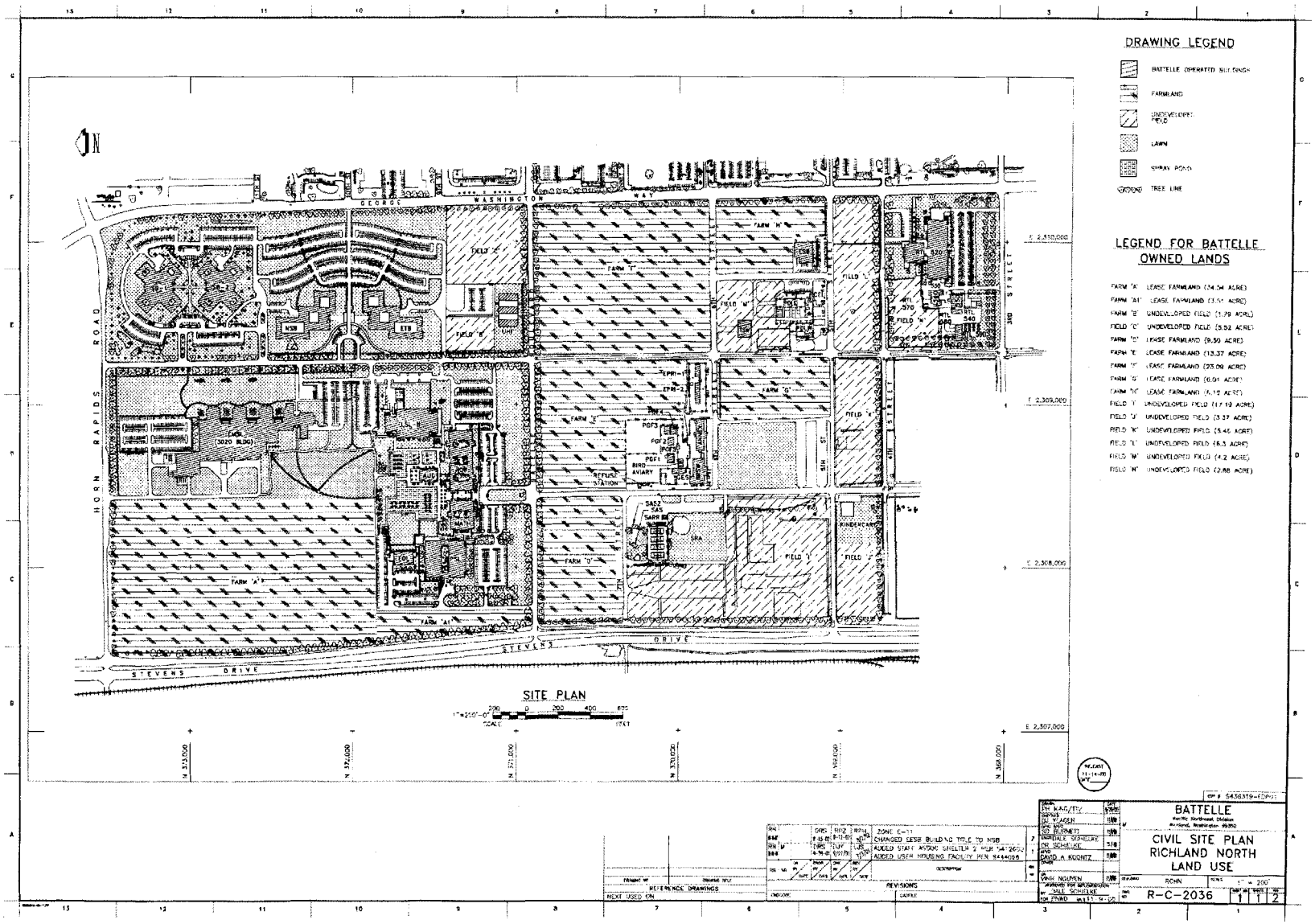


Figure Att3.8. Main PNNL campus Land Use Plan

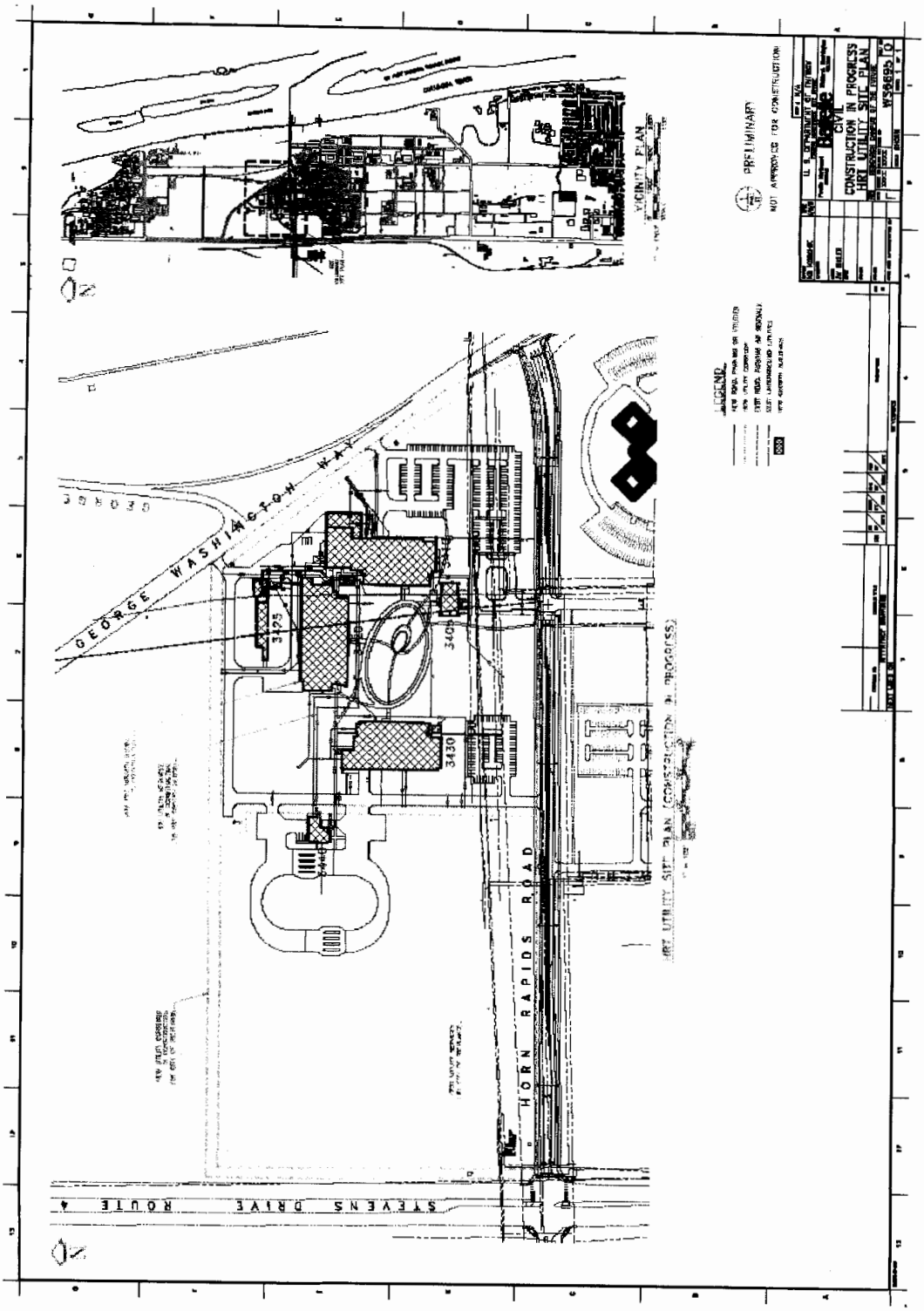


Figure Att3.9. Horn Rapids Triangle Utility Site Plan

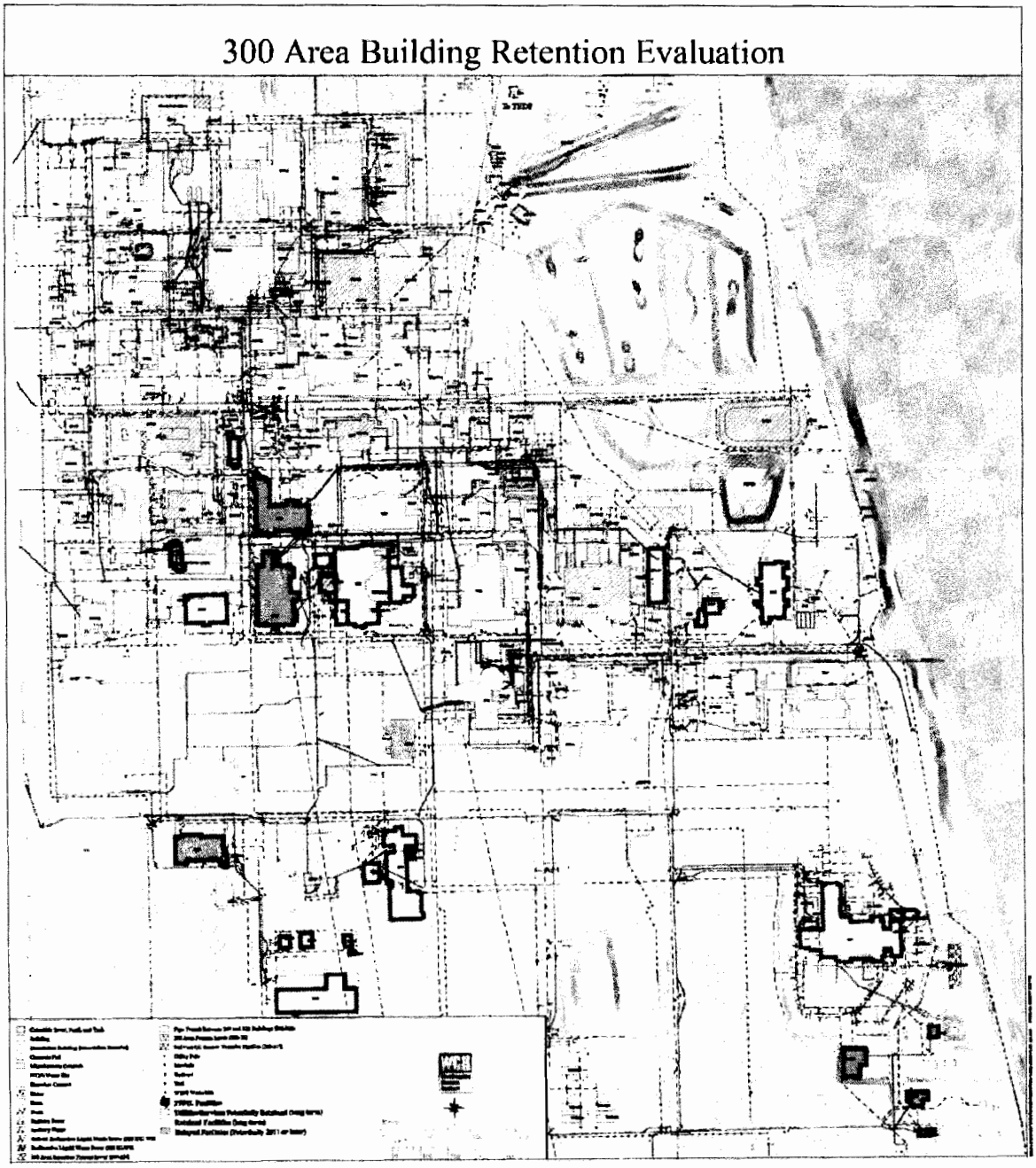


Figure Att3.10. 300 Area – Current Site Plan

Attachment 4

Fiscal Year 2008 Integrated Facilities and Infrastructure (IFI) Crosscut Budget

Integrated Facilities and Infrastructure Budget Data Sheet (IFI)	Deferred Maintenance Reduction	Gross Building Area Added	Gross Building Area Removed	FY 07 Approp. ($000)	FY 08 to Congress ($000)	FY 09 ($000)	FY 10 ($000)	FY 11 ($000)	FY 12 ($000)	FY 13 ($000)	FY 14 ($000)	FY 15 ($000)	FY 16 ($000)	FY 17 ($000)	FY 18 ($000)
SITE NAME: **Pacific Northwest Site Office (PNSO) / PNNL**	The CRL Line Item project below represents the latest planning information from the PNNL project office regarding the government funded Physical Science Facility required to address the 300 Area closure and provide Capability Replacement. The funding profile reflects guidance contained in the approval memorandum from the DOE Deputy Secretary dated 12/15/06 and the Memorandum of Understanding between NNSA, SC and DHS signed on November 7, 2006.														
PROGRAM: **Office of Science**															
1.0 Capital Line Item															
1.1 New Infrastructure Construction (facilities and additions)															
List each project															
Physical Sciences Facility CRL (SC)		**201,000**		10,000	35,379	30,549	7,977	3,643							
CRL (NNSA)		*		7,920		37,919	3,625	1,689							
CRL (DHS)		*		2,000	25,000	13,000	10,000	3,684							
* FY06 & prior TPC funding of $31,616K + CRL funding profile shown = $224,000K TPC funding.															
System Development Lab		**150,000**								12,000	55,000	23000			
Subtotal 1.1		**351,000**		**19,920**	**60,379**	**81,468**	**21,602**	**9,016**	-	**12,000**	**55,000**	**23,000**	-	-	-
1.2 All Other Infrastructure Projects (recap)															
List each project															
Subtotal 1.2		**0**		0	0	0	0	0	0	0	0	0	0	0	0
Total Infrastructure Line Items (1.1 + 1.2)		**351,000**	**0**	**19,920**	**60,379**	**81,468**	**21,602**	**9,016**	-	**12,000**	**55,000**	**23,000**	**0**	**0**	**0**
1.3 Programmatic Line Items that Add Space															
EMSL North (lab & office addition)		**55,000**							4,000	17,000	9,000				
Subtotal 1.3				0	0	0	0	0	4000	17000	9000	0	0	0	0
Subtotal Line Item Projects (1.1 +1.2+1.3)		**351,000**	**0**	**19,920**	**60,379**	**81,468**	**21,602**	**9,016**	**4,000**	**29,000**	**64,000**	**23,000**	**0**	**0**	**0**
2.0 General Plant Project (GPP) (Include project number; funding program and whether it is programmatic or not))															
2.1 New Construction (facilities and additions)															
General Purpose Research Facility (GPRF)		**10,000**		2,372											
Subtotal 2.1 New Construction GPP				**2,372**	-	-	-	-	-	-	-	-	-	-	-
2.2 All Other GPP Projects (recap including alterations and improvements)															
Other Future Federal Construction Projects				1,178	2,600										
EMSL Upgrades				850	150										
Research Facilities Upgrades (300 Area)					750										
Subtotal 2.2 All Other (recap) GPP				**2,028**	**3,500**						-	-	-	-	-
Subtotal GPP (2.1 + 2.2)		**10,000**	0	**4,400**	**3,500**	-	-	-	-	-	-	-	-	-	-
3.0 Institutional General Plant Project (IGPP)															
New Laboratory Capability Development Projects				500	2,000	1,500	1,500	3,000	5,000	7,200	6,300	6,700	6,300	5,800	6,800
Subtotal IGPP Projects				**500**	**2,000**	**1,500**	**1,500**	**3,000**	**5,000**	**7,200**	**6,300**	**6,700**	**6,300**	**5,800**	**6,800**
4.0 Operating/Expense for Excess Elimination and Other															
4.1 Excess Elimination (demolition, sale, lease, transfer) Show area eliminated in Gross Area column															
List each project															
4.1 Subtotal															
4.2 All Other (List direct O&E maintenance under 5.1)															
Provide project level detail															
4.2 Subtotal															
Subtotal 4.0 Operating/Expense Projects (4.1 + 4.2)															
TOTAL Capital & Operating Investment:		**361,000**	-	**24,320**	**63,879**	**81,468**	**21,602**	**9,016**	**4,000**	**29,000**	**64,000**	**23,000**	-	-	-
TOTAL Overhead Investments (IGPP)		-	-	**500**	**2,000**	**1,500**	**1,500**	**3,000**	**5,000**	**7,200**	**6,300**	**6,700**	**6,300**	**5,800**	**6,800**

Integrated Facilities and Infrastructure Budget Data Sheet (IFI)	Gross Sq Ft.	FY 07 Approp. ($000)	FY 08 to Congress ($000)	FY 09 ($000)	FY 10 ($000)	FY 11 ($000)	FY 12 ($000)	FY 13 ($000)	FY 14 ($000)	FY 15 ($000)	FY 16 ($000)	FY 17 ($000)	FY 18 ($000)
SITE NAME													
PROGRAM:													
5.0 Maintenance & Repair													
5.1 Direct Funded (by HQ or Site Program)*													
List direct O/E maintenance projects >$500,000													
Subtotal 5.1 Total Direct Maintenance & Repair													
5.2 Indirect (from Overhead or Space Charges)													
Include indirect O/E maintenance projects > $500,000													
Environmental Molecular Science laboratory (EMSL)		1,451	1,917	1,240	1,214	1,463	2,429	1,495	1,072	2,077	5,276	1,966	1,716
Physical Sciences Facility (New CRL replacement bldg)					713	1,957	2,016	2,077	2,139	2,203	2,270	2,338	2,408
System Development Lab											1,350	1,800	1,854
Future Federal Construction (Line Item, GPP and IGPP)				100	302	408	617	1,430	1,560	1,593	3,426	3,498	3,632
Subtotal 5.2 Total Indirect Maintenance & Repair		1,451	1,917	1,340	2,229	3,828	5,062	5,002	4,771	5,873	12,322	9,602	9,609
Subtotal Total Maintenance & Repair (5.1 + 5.2)		1,451	1,917	1,340	2,229	3,828	5,062	5,002	4,771	5,873	12,322	9,602	9,609
5.3 Hqs Direct Funded Deferred Maintenance Reduction													
Subtotal 5.3 Total Direct Deferred Maintenance													
5.4 Indirect Funded Deferred Maintenance Reduction (from Overhead or Space Charges)													
Include indirect O/E maintenance projects > $500,000													
Subtotal 5.4 Total Indirect Deferred Maintenance													
Total Deferred Maintenance (5.3 + 5.4)		-	-	-	-	-	-	-	-	-	-	-	-
Total Maintenance (5.1 + 5.2 +5.3 +5.4)		1,451	1,917	1,340	2,229	3,828	5,062	5,002	4,771	5,873	12,322	9,602	9,609
6.0 Indirect O&E													
6.1 Excess Elimination (demolition, sale, lease, transfer) funded from indirect funds. Show area eliminated in Gross Area column													
6.1 Total Indirect Excess Elimination													
6.2 Other Indirect Funded (includes modifications, additions, improvements, etc. that does not qualify as GPP or maintenance)													
CRL Transition Costs		4,800	8,900	10,000	6,600	2,100							
CRL 300 Area Expensed Modifications		1,000	850	950									
Future Expensed Improvements							1,000	1,000	1,000	1,000	1,000	1,000	1,000
6.2 Total Other Indirect O&E		5,800	9,750	10,950	6,600	2,100	1,000	1,000	1,000	1,000	1,000	1,000	1,000
6.0 Total Indirect O&E													

* Generally, facilities maintenance and repair expenses are funded through an indirect overhead charge. In some cases, however, a laboratory may charge maintenance directly to a specific program. An example of this might be if the maintenance were performed in a building used only by a single program. These direct-funded charges are nonetheless in the nature of indirect charges, and are not directly budgeted.

Integrated Facilities and Infrastructure Budget Data Sheet (IFI)															
SITE NAME															
PROGRAM:															
7.0 Summary of Area Added & Eliminated by Year															
7.1 Total Area to be Eliminated Each Year (List of projects, by type of funding, with project number, and AREA eliminated by fiscal year accomplished)	Project Number	Gross SF Removed	FY 06 Sq Ft	FY 07 Sq Ft	FY 08 Sq Ft	FY 09 Sq Ft	FY 10 Sq Ft	FY 11 Sq Ft	FY 12 Sq Ft	FY 13 Sq Ft	FY 14 Sq Ft	FY 15 Sq Ft	FY 16 Sq Ft	FY 17 Sq Ft	FY 18 Sq Ft
Line Item from Block 1 (show each that removes space)															
Subtotal Line Items															
GPP from Block 2 (show each that removes space)															
Subtotal GPP															
IGPP from Block 3 (show each that removes space)															
Subtotal IGPP															
Operations/Expense from Block 4.1 (show each that removes space)															
Subtotal Block 4.1															
Indirect Operations/ Expense from Block 6.1 (show each that removes space)															
Subtotal Block 6.1															
Transfer by sale or lease, or transfer to an outside federal agency															
Provide detail															
Subtotal Transfer or Lease															
Subtotal 7.1 Space Removed															
7.2 Total Area to be Added by GPP, IGPP, and LI Construction (List of projects, by type of funding, with project number, and AREA add by fiscal year accomplished).		Gross SF Added	FY 06 Sq Ft	FY 07 Sq Ft	FY 08 Sq Ft	FY 09 Sq Ft	FY 10 Sq Ft	FY 11 Sq Ft	FY 12 Sq Ft	FY 13 Sq Ft	FY 14 Sq Ft	FY 15 Sq Ft	FY 16 Sq Ft	FY 17 Sq Ft	FY 18 Sq Ft
Line Item (list)															
Physical Sciences Facility (New CRL replacement bldg)	**07-SC-05**	201,000						201,000							
EMSL North (lab & office addition)	**TBD**	55,000									55,000				
System Development Lab	**TBD**	150,000										150,000			
Subtotal Line Items		406,000	-	-	-	-	-	201,000	-	-	55,000	150,000	-	-	-
GPP (List)															
General Purpose Research Facility (GPRF)	**52831**	10,000				10,000									
Subtotal GPP		10,000	-	-	-	10,000	-	-	-	-	-	-	-	-	-
IGPP (List)															
Subtotal IGPP		-													
Subtotal 7.2 Area Added		416,000	-	-	-	10,000	-	201,000	-	-	55,000	150,000	-	-	-

*The square feet listed in Section 7.2 only reflects the specific projects callout out in Sections 1 and 2.

Attachment 5

Prioritized List of Line Item Projects

Attachment 5

Prioritized List of Line Item Projects

The IFI Crosscut provided by PNNL lists three Line Item Projects, two that are part of the Science Laboratory Infrastructure (SLI) Initiative (the Physical Sciences Facility—PSF—Project and the Systems Development Laboratory—SDL), and one that is anticipated to be programmatic funded (the EMSL North Laboratory expansion). This attachment provides only information for the SLI Initiative Line Items and priorities. The highest priority is the PSF. This project has received CD-1 and CD-2 approval with CD-3a approval planned for the fourth quarter of FY 2007. The second is the $90 million SDL facility. Details of both of these projects, and the EMSL expansion can be found in Section D9, Recapitalization and Modernization.

Laboratory:	PNNL
Project Title:	Physical Sciences Facility (Capability Replacement Laboratory Project)
Project Number*:	PNNL-1
Estimated Cost	$98,444
Near, Mid or Far-term:	near
Project Description/Justification:	This project replaces PNNL's mission critical capabilities located in Hanford's 300 Area that are impacted by cleanup. The project consists of constructing a new Physical Sciences Facility, rehabing 4 existing 300 Area facilities (325, 331, 318, 350), and constructing two new third-party financed facilities. The Capability Replacement Laboratory Project has completed CD-0 and CD-1. CD-2 will be completed this year. The line item portion of the project totals $224M and consists of construction of the Physical Sciences Facility (PSF) and upgrade of the 325 Building Radiochemical Processing Laboratory. The $224M line item includes $98,444K from the SLI program and funding from NNSA and DHS of $125,556K. Other funding support includes $5M investment from the State of Washington for utilities infrastructure, $12M from EM for utilities infrastructure in the 300 Area, $32.4M PNNL contribution in overhead and IGPP for facility rehab and transition; and construction of 2 third-party facilities with a total estimated value of $90M. Funding in FY09 may potentially be reduced by $10M and this funding shifted to FY07 pending the outcome of the business case for the third-party facilities.

Funding Profile:	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14**	**FY15**	**FY16**	**FY17**	**FY18**
Expenditure ($K)	$40,549	$7,977	$3,643	$0	$0	$0	$0	$0	$0	$0

Gross Sq Ft	**Added:**	201,000	**Removed:**	370,000	**Rehabed:**	145,000
Def. Maint. Reduc. (1)	5,000					
CAMP Score		**Principal Driver:**				

(1) - Reported DM for 325, 331, 318, and 350 buildings is $5.0M and DM reduction at this time is limited to this amount. DM assessment will occur due to change to a 20 year life extension for these buildings with a potential DM may be increased. Upon this being completed, a review of the planned maintenance and rehabilitation actions will be performed to determine the revised DMR amount.

Laboratory:	PNNL
Project Title:	System Development Laboratory
Project Number*:	PNNL-2
Estimated Cost	$90,000
Near, Mid or Far-term:	Mid
Project Description/Justification:	Provides replacement space for capabilities currently housed in 2 higher-risk leased facilities. PNNL capabilities in sensing and measurement technology and chemistry / process science are housed in 2400 Stevens, and the Applied Process Engineering Laboratory (APEL). 2400 Stevens is a 93,351-gross-square-foot (gsf) Class C facility; wood constructed converted warehouse, in the last 1/3 of useful life. PNNL occupies 54,000 gsf of space in the APEL facility (75% of the total facility). This facility was designed as entrepreneurial space for start-up companies and it was intended that PNNL occupy no more that 50% of the space. New facility space would provide more robust systems to address needed ventilation requirements as well as the increasing need for secure clean room/electronics lab space. If this space must be replaced via a new leased facility, estimated annual lease costs would be $7–9M per year.

Funding Profile:	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14**	**FY15**	**FY16**	**FY17**	**FY18**
Expenditure ($K)	$0	$0	$0	$0	$12,000	$55,000	$23,000	$0	$0	$0

Gross Sq Ft	**Added:**	150,000	**Removed:**	130,000	**Rehabed:**
Def. Maint. Reduc.					
CAMP Score	60	**Principal Driver:**	IV		

Attachment 6

Excess Facilities

Pacific Northwest National Laboratory manages only one DOE-EM-owned excess facility, the 614 Building. This facility is no longer occupied and is identified as shutdown pending transfer in the Facility Information Management System. Please refer to Section D4 for detailed information related to this building and vacating and transferring other specific 300 Area facilities to the River Corridor Cleanup Contractor.

PNSO Concurrence Sheet

Concurrence
Office & Init/Sig. OD/Escamillo
Date
Office & Init/Sig. **OD/Christensen**
Date 6/28/07
Office & Init/Sig.
Date
Office & Init/Sig.
Date
Office & Init/Sig.
Date
Office & Init/Sig.
Date
Office & Init/Sig.
Date
Office & Init/Sig.
Date

bcc:
OD Official File
OD Rdg File
D. L. Biancosino, PD
J. L. Carlson, OD
R. F. Christensen, OD
J. M. Escamillo, OD
R. M. Kilbury, PD
J. F. Suess, OD
R. N. Warren, OD

RECORD NOTE: PNNL volunteered to be one of three labs that submitted its TYSP early to satisfy the OECM requirement for early submittal. This allowed the other seven labs to submit by the end of July. This was reviewed by Dave Biancosino, Jeff Carlson, Russ Warren, Jim Suess, Ryan Kilbury.

07-OD-0111/gm